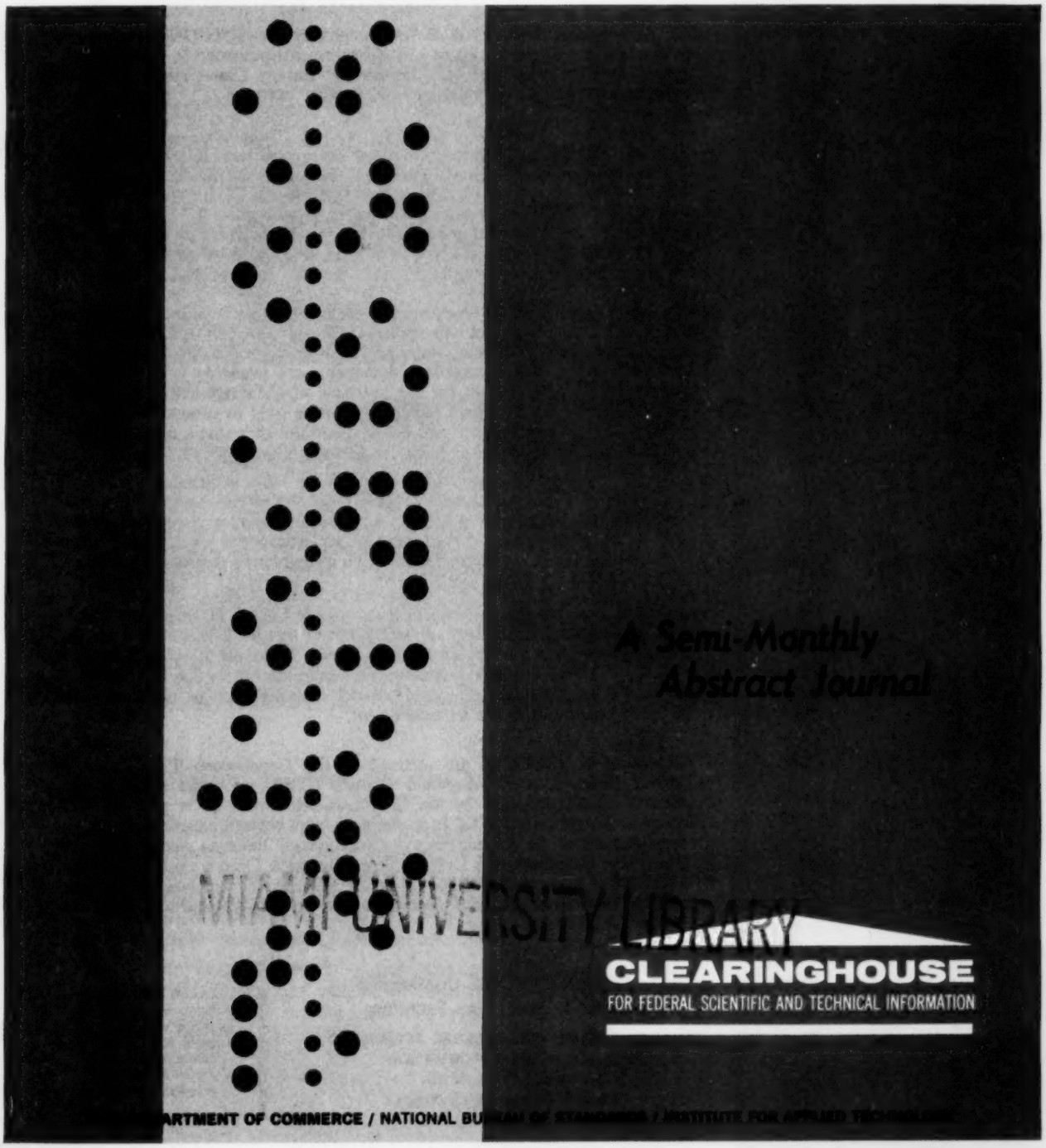
C 41.21: 67/20

October 25, 1967

U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS

NOV 13 1967



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INDEX

All entries in USGRDR are indexed in the *Government-Wide Index to Federal Research & Development Reports (GWI)* published semi-monthly and sold on subscription by the Clearinghouse at $22.00 a year ($27.50 foreign). Single copy $3.00. Indexing data from current issues of announcement journals of the Atomic Energy Commission, National Aeronautics and Space Administration, and Defense Documentation Center are also included in this index to provide a single reference guide to new unclassified Government-sponsored research and development in the physical sciences, engineering, and related technology.

U.S. DEPARTMENT OF COMMERCE
Alexander B. Trowbridge, Secretary

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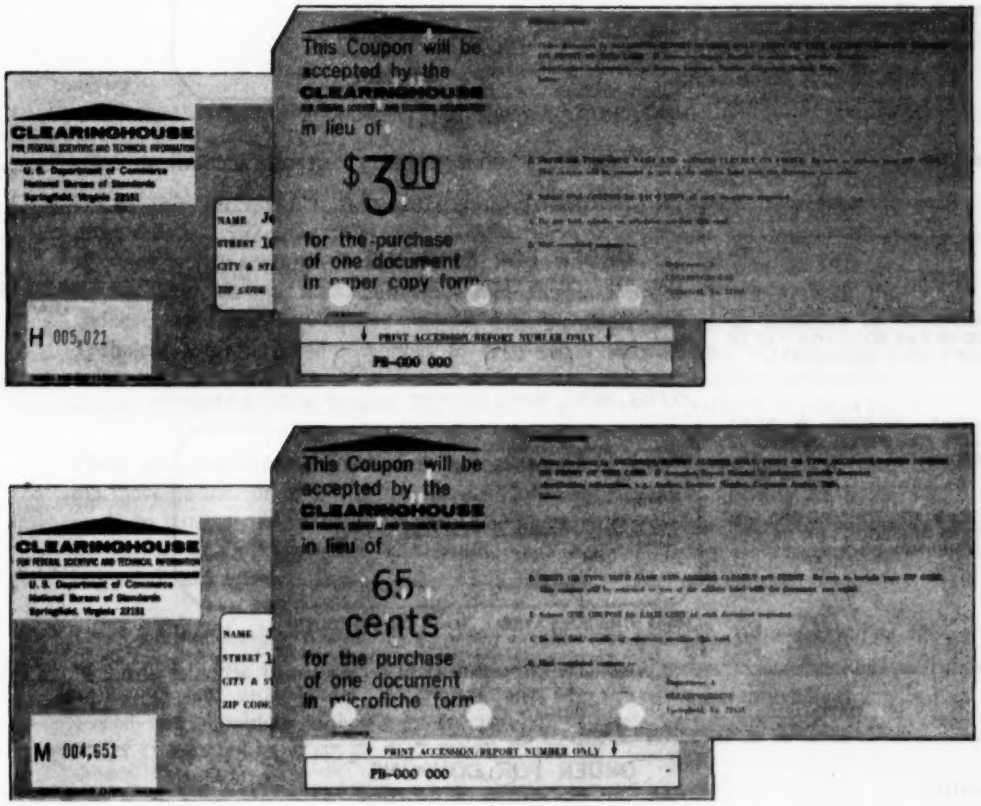

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There are some format errors and inconsistencies in this journal resulting from the machine merger of the data generated by several agencies. Efforts are being made to correct these inconsistencies. The agencies involved are working with a task group of the Committee on Scientific and Technical Information to develop improved interagency standards which will eliminate these problems.

The Clearinghouse is striving to improve the content and format of USGRDR so that it will become increasingly valuable to the general public as an announcement tool and order guide. Comments and suggestions for improvement are invited and should be directed to the Director, Clearinghouse, Springfield, Va. 22151.

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Reports are announced under 22 subject categories called FIELDS. Each FIELD is divided into subcategories called GROUPS. Documents are listed alphanumerically by accession number within the GROUP. This classification system was adopted by the Committee on Scientific and Technical Information (COSATI). The *COSATI Subject Category List* (AD 612 200) is available from the Clearinghouse at $3.00.

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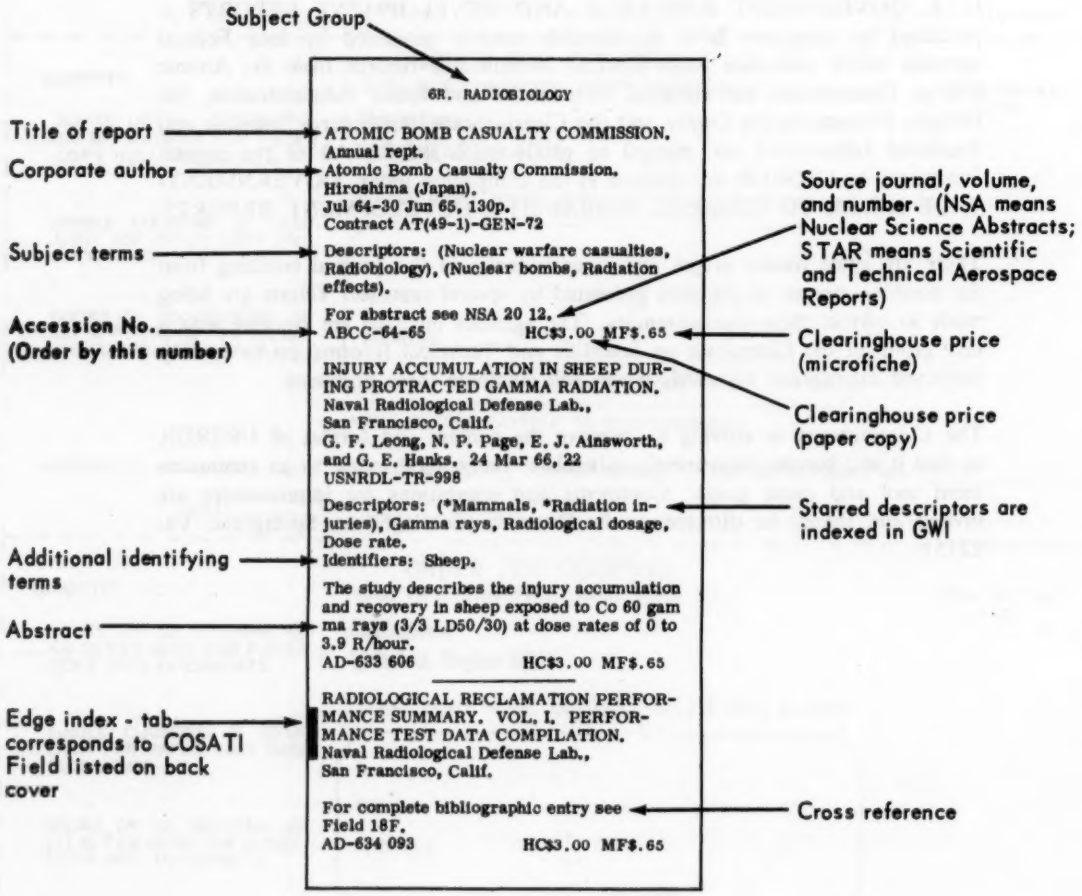
Subject Group
6R. RADIOBIOLOGY
Title of report
ATOMIC BOMB CASUALTY COMMISSION. Annual rept.
Corporate author
Atomic Bomb Casualty Commission. Hiroshima (Japan).
Jul 64-30 Jun 65, 130p.
Contract AT(49-1)-GEN-72
Subject terms
Descriptors: (Nuclear warfare casualties, Radiobiology), (Nuclear bombs, Radiation effects).
Source journal, volume, and number. (NSA means Nuclear Science Abstracts; STAR means Scientific and Technical Aerospace Reports)
For abstract see NSA 20 12.
Accession No. (Order by this number)
ABCC-64-65 HC$3.00 MF$.65
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INJURY ACCUMULATION IN SHEEP DURING PROTRACTED GAMMA RADIATION.
Naval Radiological Defense Lab., San Francisco, Calif.
G. F. Leong, N. P. Page, E. J. Ainsworth, and G. E. Hanks. 24 Mar 66, 22
USNRDL-TR-998
Descriptors: (*Mammals, *Radiation injuries), Gamma rays, Radiological dosage, Dose rate.
Starred descriptors are indexed in GWI
Additional identifying terms
Identifiers: Sheep.
Abstract
The study describes the injury accumulation and recovery in sheep exposed to Co 60 gamma rays (3/3 LD50/30) at dose rates of 0 to 3.9 R/hour.
AD-633 606 HC$3.00 MF$.65
Edge index - tab corresponds to COSATI Field listed on back cover
RADIOLOGICAL RECLAMATION PERFORMANCE SUMMARY. VOL. I. PERFORMANCE TEST DATA COMPILATION.
Naval Radiological Defense Lab., San Francisco, Calif.
For complete bibliographic entry see Field 18F.
Cross reference
AD-634 093 HC$3.00 MF$.65

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SUBJECT CATEGORY HEADINGS

Use Edge Index on back cover to locate COSATI Field in journal

COSATI FIELD

01 AERONAUTICS

Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities.

02 AGRICULTURE

Includes agricultural chemistry; agricultural economics; agricultural engineering; agronomy and horticulture; animal husbandry; and forestry.

03 ASTRONOMY AND ASTROPHYSICS

Includes astronomy; astrophysics; and celestial mechanics.

04 ATMOSPHERIC SCIENCES

Includes atmospheric physics and meteorology.

05 BEHAVIORAL AND SOCIAL SCIENCES

Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.

06 BIOLOGICAL AND MEDICAL SCIENCES

Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance (medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects.

07 CHEMISTRY

Includes chemical engineering; inorganic chemistry; organic chemistry; physical chemistry; and radio and radiation chemistry.

08 EARTH SCIENCES AND OCEANOGRAPHY

Includes biological oceanography; cartography; dynamic oceanography; geochemistry; geodesy; geography; geology and mineralogy; hydrology and limnology; mining engineering; physical oceanography; seismology; snow, ice, and permafrost; soil mechanics; and terrestrial magnetism.

09 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes components; computers; electronic and electrical engineering; information theory; subsystems; and telemetry.

10 ENERGY CONVERSION (Non-Propulsive)

Includes conversion techniques; power sources; and energy storage.

COSATI FIELD

11 MATERIALS

Includes adhesives and seals; ceramics, refractories, and glasses; coatings, colorants, and finishes; composite materials; fibers and textiles; metallurgy and metallography; miscellaneous materials; oils, lubricants, and hydraulic fluids; plastics; rubbers; solvents, cleaners, and abrasives; and wood and paper products.

12 MATHEMATICAL SCIENCES

Includes mathematics and statistics and operations research.

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

Includes air conditioning, heating, lighting, and ventilating; civil engineering; construction equipment; materials, and supplies; containers and packaging; couplings, fittings, fasteners, and joints; ground transportation equipment; hydraulic and pneumatic equipment; industrial processes; machinery and tools; marine engineering; pumps, filters, pipes, tubing, fittings, and valves; safety engineering; and structural engineering.

14 METHODS AND EQUIPMENT

Includes cost effectiveness; laboratories, test facilities, and test equipment; recording devices; reliability; and reprography.

15 MILITARY SCIENCES

Includes antisubmarine warfare; chemical, biological, and radiological warfare; defense; intelligence; logistics; nuclear warfare; and operations, strategy, and tactics.

16 MISSILE TECHNOLOGY

Includes missile launching and ground support; missile trajectories; missile warheads and fuzes; and missiles.

17 NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

Includes acoustic detection; communications; direction finding; electromagnetic and acoustic countermeasures; infrared and ultraviolet detection; magnetic detection; navigation and guidance; optical detection; radar detection; and seismic detection.

18 NUCLEAR SCIENCE AND TECHNOLOGY

Includes fusion devices (thermonuclear); isotopes; nuclear explosions; nuclear instrumentation; nuclear powerplants; radiation shielding and protection; radioactive wastes and fission products; radioactivity; reactor engineering and operation; reactor materials; reactor physics; reactors (power); reactors (non-power); and SNAP technology.

19 ORDNANCE

Includes ammunition, explosives; bombs; combat vehicles; explosions, ballistics, and armor; fire control and bombing systems; guns; rockets; and underwater ordnance.

20 PHYSICS

Includes acoustics; crystallography; electricity and magnetism; fluid mechanics; masers and lasers; optics; particle accelerators; particle physics; plasma physics; quantum theory; solid-mechanics; solid-state physics; thermodynamics and wave propagation.

21 PROPULSION AND FUELS

Includes air-breathing engines; combustion and ignition; electric propulsion; fuels; jet and gas turbine engines; nuclear propulsion; reciprocating engines; rocket motors and engines; and rocket propellants.

22 SPACE TECHNOLOGY

Includes astronautics; spacecraft; spacecraft trajectories and reentry; and spacecraft launch vehicles and ground support.

RESEARCH highlights

Reports of current high industrial interest

Highlighted documents, unless otherwise designated, are sold at the new unit price of $3.00 each, 65 cents microfiche.

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Earth Sciences and Mineral Industries

PROJECT MOHOLE was the United States' most ambitious scientific effort to extend man's knowledge of the evolution and structure of the earth. The project, which was sponsored by the National Science Foundation, had the following primary objectives: (1) to drill and core a hole approximately 20,000 feet through the entire crust of the earth to the Mohorovicic discontinuity from a floating platform 15,000 feet above a deep-ocean trench, (2) to determine the physical and chemical nature of the discontinuity at the selected site, and (3) to recover samples of all the crustal layers and mantle rock for laboratory analysis.

In March 1962 Brown and Root, Inc., of Houston, Texas was selected as prime contractor to conduct the drilling operations and to perform research and development in all phases of off-shore drilling technology needed to successfully complete the project. The 398 research and progress reports

prepared by Brown and Root and their subcontractors in connection with their work on Project Mohole from November 1963 to September 1966 are now available from the Clearinghouse. The complete set of 398 reports may be purchased as PB-175 400 in two forms: paper copy for $450.00 or microfiche for $150.00 (please specify which when ordering). To facilitate the ordering of individual copies, an annotated bibliography of all 398 reports has been prepared by the Clearinghouse and included in Field 8 of the semi-monthly abstract journal, U. S. Government Research and Development Reports (USGRDR) for October 25, 1967. ORDER. . . . . USGRDR, Volume 67, Number 20, October 25, 1967, Clearinghouse for Federal Scientific and Technical Information, Springfield, Va. Individual copies cost $3.00; a yearly subscription costs $30.00 ($37.50 foreign).

Atmospheric Sciences

AN INTEGRATED METEOR RADAR SYSTEM FOR WIND AND DENSITY MEASUREMENTS IN THE UPPER ATMOSPHERE has been developed by workers at the Stanford Electronics Laboratories of Stanford University. The final report of work performed from March 1, 1964, to February 28, 1967, contains a description of the synthesis of the coherent pulse radar that can measure echo strength, range, elevation angle, and doppler shift of the signals reflected from ionized meteor trails occurring in the region of 80 to 110 km above the surface of the earth. The main features of this new radar system are digital recording and processing of the data: the use of a composite signal waveform that permits simultaneous measurement of range, amplitude, and doppler at low peak power; and the capacity to record both amplitude and sign of the doppler shift in one channel. The radar station is inexpensive and reliable enough to provide the basis for multistation synoptic measurements of upper atmospheric winds and, somewhat less accurately, densities. The report also contains an analysis of system performance and measurements taken with three different antenna arrangements. ORDER. . . . . AD-658 463 -- AN INTEGRATED METEOR RADAR SYSTEM FOR WIND AND DENSITY MEASUREMENTS IN THE UPPER ATMOSPHERE. . . . . Robert Nowak, Stanford Electronics Labs., Stanford, Calif., for the Air Force, May 67, 148p.

Biological and Medical Sciences

CLINICAL SPACE MEDICINE, a field in which little has been written, is the subject of a report recently prepared by the Lovelace Foundation for Medical Education and Research. In addition to discussions of the clinical manifestations, diagnosis, and treatment of possible medical problems in

space, the various hazards of space operations are defined and analyzed in order to determine their possible medical effects. The report contains chapters on acute hypoxia, ebullism syndrome, "explosive" decompression injuries, decompression sickness, aerotitis media and aerosinusitis, heat disorders, cold injury and hypothermia, medical problems due to particle and droplet contamination of the spacecraft cabin atmosphere, urinary calculi, medical implication of cardiovascular adaptations to weightlessness, acute radiation effects injuries from meteoroid penetration, burns, injuries from mechanical forces, carbon dioxide toxicity, and general aspects of medical management. Each chapter contains a bibliography which can be used to identify areas of further research. ORDER. . . . . N67-32905 -- CLINICAL SPACE MEDICINE: A PROSPECTIVE LOOK AT MEDICAL PROBLEMS FROM HAZARDS OF SPACE OPERATIONS. . . . . D. E. Busby, Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex., for NASA, July 67, 448p.

WORK ON THE DESIGN AND FABRICATION OF A MOCK CIRCULATORY SYSTEM was concluded by Hydrospace Research Corp., of Rockville, Maryland, with the delivery to designated users of five such systems. The delivered systems consisted of a compliant aorta matched to a controlled leakage section, a reflection section, and a venous return to the right heart.

The final report describing the design, development, and construction of the original Mock Circulatory System is now available from the Clearinghouse. In addition to descriptions of the original work, the report contains recommendations for, and the design of, an Advanced Mock Circulatory System which successfully corrects those weaknesses found in the original system. The Advanced Mock Circulatory System is under the direct control of a small digital computer, and the system can be programmed to: (1) exercise the artificial heart by simulating various levels of exercise, (2) measure control-system reactions to programmed natural heart failures, and (3) simulate various types of circulatory failures. ORDER. . . . . PB-175 719 -- FINAL REPORT OF THE MOCK CIRCULATORY SYSTEM. . . . . Hydrospace Research Corp., Rockville, Md., for NIH, Apr. 67, 214p.

Chemicals

CHEMICAL-YIELD DETERMINATIONS IN RADIOCHEMISTRY are most commonly performed by weighing the final counting form of the element being determined as a precipitate mounted on filter paper or plated on a counting disc of some inert metal. This technique, however, is usually inaccurate

because of the precipitate's uncertain composition and the difficulty of precisely weighing milligram amounts of material when they are mounted on filter paper.

A monograph containing analytical procedures for performing accurate chemical-yield determinations of 62 elements has recently been prepared by the Brookhaven National Laboratory. The collection, which has evolved over a period of about 15 years, contains procedures that require only those instruments likely to be available in most laboratories; the emphasis, therefore, is on spectrophotometric or flame-photometric methods and a few polarographic methods. Information on the preparation and standardization of the solutions of the elements, though not within the scope of the monograph, is usually considered in the references cited for each procedure. ORDER. . . . . NAS-NS 3111 -- CHEMICAL YIELD DETERMINATIONS IN RADIOCHEMISTRY. . . . . E. F. Norton, Brookhaven National Lab., Upton, N. Y., for the National Academy of Sciences, recd Aug. 67, 101p.

Fluid- and Aerodynamics

THE RECENT TREND IN THE TECHNOLOGY OF CONTROL AND COMPUTATION WITH FLUID AMPLIFIERS has been to reduce amplifier sizes for lower power consumption and higher operating rates. This trend has created the need for experimental data in jet transition, since the random perturbations contained in a turbulent stream, in general, are required for the operation of miniature amplifiers. A report recently prepared by the Martin Co. describes work performed to determine the position at which an initially laminar jet will respond to random fluctuations and transform into a turbulent-flow regime. Experimental data are presented which verify the least Reynolds number at which transient disturbances are amplified to become turbulence. The distances at which transition to turbulence occurs for several typical geometries are also given. ORDER. . . . . AD-656 780 -- TRANSITION TO TURBULENCE FOR SUBMERGED INCOMPRESSIBLE AND FREE COMPRESSIBLE FLUID JETS. . . . . C. P. McKensie and W. P. Dorsey, Martin Marietta Corp., Orlando, Fla., for the Air Force, June 67, 60p.

Information Technology

THE IMPLEMENTATION OF THE LISP SYSTEM ON A SDS 94Ø COMPUTER is described in a report recently received at the Clearinghouse. The system is an upward compatible extension of LISP 1.5 for the IBM 7090 and incorporates several new features that allow it to function as an on-line

language. These new features include tracing, conditional breakpoints in functions for debugging, and a sophisticated LISP-oriented editor. The 94Ø LISP SYSTEM has a memory store of approximately 50,000 free words: the memory store utilizes special paging techniques for a drum to provide reasonable computation times. The system includes an interpreter, a fully compatible compiler, and an assembly language facility for inserting machine code subroutines. ORDER. . . . . AD-656 771 -- THE BBN 94Ø LISP SYSTEM . . . . . D. G. Bobrow et al., Bolt Beranek and Newman Inc., Cambridge, Mass., for the Air Force, July 67, 138p.

Transportation (Land, Sea, Air, Space)

THE DOMESTIC AIR-FREIGHT INDUSTRY is a transportation system composed of both surface and air links, each performing functions in the movement of commodities from origin to destination. A study has been completed recently that examines the component functions of this transportation system, including its organizational elements, coordination, and customer service patterns. The general industrial characteristics considered include air-freight traffic and the attitudes, plans, and equipment of certified passenger-cargo and all-cargo airlines that transport a high volume of air freight. The air-freight forwarders are described, as are the other important contributors to the operation and development of the industry, and representative forecasts of domestic air-freight growth are given. In the discussion of air-freight growth, the report analyzes those efforts now underway to improve service to meet anticipated customer demand. Particular emphasis is placed upon the planned introduction of large subsonic jet transports (Boeing Model 747 and Lockheed L-500 series): and their availability, general characteristics, economic performance, and the airlines' apparent preferences for each type are presented. ORDER. . . . . AD-658 397 -- THE DOMESTIC AIR FREIGHT INDUSTRY AND INTRODUCTION OF LARGE SUBSONIC TRANSPORTS. . . . . R. H. Reeher, Analytic Services Inc., Falls Church, Va., Aug. 67, 149p.

RESEARCH & DEVELOPMENT REPORTS

1. AERONAUTICS

1A. Aerodynamics

LIMITS ON MINIMUM-SPEED V/STOL WIND-TUNNEL TESTS.
Washington Univ Seattle
For primary bibliographic entry see Field 14B.
AD-656 810 Not available from CFSTI.

A STUDY OF THE CHARACTERISTICS OF TRANSONIC BUFFET PRESSURES ON A LARGE HAMMERHEAD CONFIGURATION,
Aerospace Corp El Segundo Calif Technical Operations
For primary bibliographic entry see Field 20D.
AD-657 013 HC$3.00 MF$0.65

HYPERSONIC STABILITY DERIVATIVES FOR A STANDARD 10 DEGREE CONE.
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-657 027 HC$3.00 MF$0.65

THE FRANK J. SEILER RESEARCH LABORATORY,
Frank J Seiler Research Lab United States Air Force Academy Colo
For primary bibliographic entry see Field 14B.
AD-657 036 HC$3.00 MF$0.65

SUBSONIC WIND TUNNEL WALL CORRECTIONS,
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 20D.
AD-657 092 HC$3.00 MF$0.65

AN EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF SEVERAL TYPES OF SURFACE ROUGHNESS ON TURBULENT BOUNDARY LAYER CHARACTERISTICS AT SUPERSONIC SPEEDS,
Texas Univ Austin Defense Research Lab
For primary bibliographic entry see Field 20D.
AD-657 134 HC$3.00 MF$0.65

THE DESIGN OF AN ACCELERATION INSENSITIVE SKIN FRICTION BALANCE FOR USE IN FREE FLIGHT VEHICLES,
Texas Univ Austin Defense Research Lab
For primary bibliographic entry see Field 14B.
AD-657 135 HC$3.00 MF$0.65

INTERFERENCE EFFECTS DUE TO RELATIVE PROXIMITY OF STATIC-PRESSURE PROBES INSUPERSONIC FLOW,
Texas Univ Austin Defense Research Lab
For primary bibliographic entry see Field 14B.
AD-657 139 HC$3.00 MF$0.65

FEASIBILITY OF A DIRECT EXPERIMENTAL TEST OF LIGHTHILL'S THEORY OF AERODYNAMIC SOUND USING FOCUSING TECHNIQUES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 20A.
AD-657 159 HC$3.00 MF$0.65

ROCKET TUNNEL GAS PROPERTIES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 20D.
AD-657 160 HC$3.00 MF$0.65

APPROXIMATE METHOD OF DETERMINING THE CONCENTRATION FIELD IN A TURBULENT GAS JET.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 20D.
AD-657 163 HC$3.00 MF$0.65

ON MENARD INSERTS IN SUPERSONIC NOZZLES.
Michigan Univ Ann Arbor Office of Research Administration
For primary bibliographic entry see Field 14B.
AD-657 177 HC$3.00 MF$0.65

DER AERODYNAMISCHE WARMESCHUTZ BEIM HOCHGESCHWINDIGKEITSFLUG (Aerodynamic Heat Protection in High Velocity Flight),
Deutsche Versuchsanstalt Fuer Luft-Und Raumfahrt E V Freiburg-Im-Breisgau (West Germany)
For primary bibliographic entry see Field 20D.
AD-657 218 Not available from CFSTI.

VARIATIONAL APPROACH TO RAREFIED FLOWS IN CYLINDRICAL AND SPHERICAL GEOMETRY,
Applicazioni E Ricerche Scientifiche S P A Milan (Italy)
For primary bibliographic entry see Field 20D.
AD-657 230 Not available from CFSTI.

THE PROBLEM OF A CYLINDER ROTATING IN A RAREFIED GAS,
Applicazioni E Ricerche Scientifiche SPA Milan (Italy)
For primary bibliographic entry see Field 20D.
AD-657 232 Not available from CFSTI.

NON-LINEAR HEAT TRANSFER BETWEEN TWO PARALLEL PLATES ACCORDING TO A MODEL WITH CORRECT PRANDTL NUMBER,
Applicazioni E Ricerche Scientifiche S P A Milan (Italy)
For primary bibliographic entry see Field 20D.
AD-657 235 Not available from CFSTI.

A COLLECTION OF SOME CONTROLLED SURFACE THERMAL ACCOMMODATION COEFFICIENT MEASUREMENTS,
Missouri Univ Columbia Physical Chemical Lab
For primary bibliographic entry see Field 20D.
AD-657 242 Not available from CFSTI.

PRELIMINARY RESULTS OF A NEW FORMULATION OF THE HYPERSONIC LEADING EDGE FLOW PROBLEM,
Defense Research Corp Santa Barbara Calif
For primary bibliographic entry see Field 20D.
AD-657 269 Not available from CFSTI.

AN INVESTIGATION OF AERODYNAMIC CONTROLS AT HYPERSONIC MACH NUMBERS.
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-657 285 HC$3.00 MF$0.65

EFFECTS OF GUST VELOCITY SPATIAL DISTRIBUTIONS ON LATERAL-DIRECTIONAL RESPONSE OF A VTOL AIRCRAFT.
Final rept. Oct 65-Feb 67,
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio
Robert L. Swaim, and Alonzo J. Connors. Jun 67, 37p Rept no. AFFDL-TR-67-93

Descriptors: (*Vertical take-off planes, *Gust loads), (*Roll, Hovering), Velocity, Moments, Yaw, Turbulence, Flight control systems, Equations of motion, Fuselages.

The effects of spanwise distribution of longitudinal and vertical components of gust velocity and longitudinal distribution of the lateral component on the lateral-directional response of a hovering VTOL aircraft are analyzed. Results show that spanwise effects of the longitudinal and vertical components are negligible, and the longitudinal distribution of the lateral component is significant in computing the power spectral densities of gust-induced side force, yawing moment, rolling moment, and the aircraft sideslip, yaw, and roll root-mean-square response angles. If the gust-induced angles of attack and sideslip angles are in the nonlinear range of lift curve slope, the above conclusions, which are based on linear aerodynamic theory, may not hold and an analysis based on momentum transfer of gust energy to the aircraft is recommended. Flow field interaction effects due to engine intake and exhaust also were not considered. (Author)
AD 657 321 HC$3.00 MF$0.65

OPERATION INSTRUCTIONS AND DESCRIPTION OF COMPUTER PROGRAM FOR FINITE DIFFERENCE SOLUTIONS OF THE LAMINAR COMPRESSIBLE BOUNDARY LAYER EQUATIONS IN THE VON MISES VARIABLES,
New York Univ N Y Dept of Aeronautics and Astronautics
For primary bibliographic entry see Field 20D.
AD-657 322 HC$3.00 MF$0.65

BLANCH ANNIVERSARY VOLUME,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 12A.
AD-657 323 HC$3.00 MF$0.65

THE EFFECT OF SEVERE NOSE BLUNTNESS ON THE STABILITY OF SLENDER CONES IN HYPERSONIC FLOW,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-657 325 HC$3.00 MF$0.65

CALCULATION OF RADIANT FLUX IN A LAMINAR BOUNDARY LAYER,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 20D.
AD-657 372 HC$3.00 MF$0.65

GAS KINETIC EQUATIONS AND THEIR APPLICATIONS TO NONEQUILIBRIUM FLOWS WITH DIFFUSION AND CHEMICAL REACTION,
Ohio State Univ Research Foundation Columbus Dept of Aeronautical and Astronautical Engineering
For primary bibliographic entry see Field 20D.
AD-657 387 Not available from CFSTI.

LAW OF THE WALL FOR TURBULENT BOUNDARY LAYERS IN COMPRESSIBLE FLOW.
Pennsylvania State Univ University Park
For primary bibliographic entry see Field 20D.
AD-657 388 Not available from CFSTI.

Group 1A — Aerodynamics

AERODINAMICA RELATIVISTICA (Relativistic Aerodynamics),
Politecnico Di Milano (Italy) Istituto Di Matematica
For primary bibliographic entry see Field 20D.
AD-657 396 Not available from CFSTI.

DER AERODYNAMISCHE WAERMESCHUTZ VON FLUGKOERPERN UNTER BESONDERER BERUECKSICHTIGUNG DER ABLATION-STECHNIK (Aerodynamic Heat Protection for Flight Vehicles with Special Consideration of Ablation Techniques),
Deutsche Versuchsanstalt Fuer Luft-Und Raumfahrt E V Freiburg-Im-Breisgau (West Germany)
For primary bibliographic entry see Field 20D.
AD-657 415 Not available from CFSTI.

FLUID MECHANICS RESEARCH.
Cornell Univ Ithaca N Y Graduate School of Aerospace Engineering
For primary bibliographic entry see Field 20I.
AD-657 429 HC$3.00 MF$0.65

AN ANALYTICAL INVESTIGATION OF THE FLAT PLATE TURBULENT BOUNDARY LAYER IN COMPRESSIBLE FLOW,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 20D.
AD-657 456 HC$3.00 MF$0.65

UN NOUVEAU TYPE DE FONCTIONS MODULATRICES POUR LA METHODE DE SHINBROT (A New Type of Modulator Functions for the Shinbrot Method),
Advisory Group for Aerospace Research and Development Paris (France)
J. Pere, and B. R. A. Burns. 1966, 54p Rept no. AGARD-549-Pt-2
NATO furnished. Text in French. Includes 'Experience with Shinbrot's Method of Transient Response' with English text.

Descriptors: (*Aircraft, Aerodynamic characteristics), (*Aerodynamic characteristics, Functional analysis), Equations of motion, Response, Stability, Control, Flight.
Identifiers: Shinbrot's method, Mirage III aircraft.

The paper by Pere presents a modification of Shinbrot's method for the analysis of aerodynamic responses, which overcomes its original difficulties of application. The paper by Burns describes an application of Shinbrot's method to the analysis of highly damped responses recorded on a Meteor and on a Dove aircraft.
AD-657 489 HC$3.00 MF$0.65

SKIN-FRICTION DRAG AT SUPERSONIC-HYPERSONIC SPEEDS WITH TRANSITION.
Ara Inc West Covina Calif
For primary bibliographic entry see Field 20D.
AD-657 519 Not available from CFSTI.

SPECTROPHOTOMETRIC MEASUREMENTS OF THE VIBRATIONAL RELAXATION OF CO IN SHOCK WAVE AND NOZZLE EXPANSION-FLOW ENVIRONMENTS.
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
A. L. Russo. Jul 67, 33p NASA-CR-87276, CAL-AD-1689-A-8
Contract NASR-109

Descriptors: *Carbon monoxide, *Nozzle expansion, *Shock wave, *Spectrophotometry, *Vibrational relaxation, Carbon, Environment, Expansion, Flow, Monoxide, Nozzle, Relaxation, Shock, Vibration, Wave.

For abstract, see STAR 05 19.
N67-33015 HC$3.00 MF$0.65

RECENT PROGRESS IN THE O.N.E.R.A. HOT-SHOT WIND-TUNNELS.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 19.
N67-33335 HC$3.00 MF$0.65

EXPERIMENTAL ANALYSIS OF THE NEAR-WAKE OF A SLENDER BODY WITH NO LATERAL SUPPORT.
Analyse Experimentale Du Proche Sillage D'un Corps Elance Libre de Tout Support Lateral
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
J. Delery, and M. Sirieix. 1967, 47p ONERA-TP-454/1967/
in French Presented At the Agard Meeting on Plasmas Occurring in Wakes, Fort Collins, Colo., 10-12 May 1967

Descriptors: *Axisymmetric body, *Hypersonic flow, *Laminar wake, *Magnetic suspension, *Slender body, Axisymmetry, Blunt, Body, Conference, Cylinder, Flow, Laminar, Magnetic, Model, Nozzle, Scale, Slender, Supersonic, Suspension, Testing, Theory, Turbulent, Wake.

For abstract, see STAR 05 19.
N67-33336 HC$3.00 MF$0.65

RESEARCH AND DEVELOPMENT PROGRAMS QUARTERLY REPORT, JAN. - MAR. 1967.
Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
For primary bibliographic entry see Field 20D.
For abstract, see STAR 05 19.
N67-33361 HC$3.00 MF$0.65

AERODYNAMIC CHARACTERISTICS OF A SPHERICALLY BLUNTED 25 DEG CONE AT A MACH NUMBER OF 20.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
J. E. Harris. Aug 67, 23p NASA-TN-D-4098
Contract 124-07-02-54-23

Descriptors: *Aerodynamic characteristics, *Blunt body, *Cone, *Pressure distribution, Aerodynamic, Angle of attack, Blunt, Body, Characteristics, Coefficient, Distribution, Drag, Hotshot, Lift, Longitudinal, Nitrogen, Pressure, Spherical, Stability, Static, Tunnel.

For abstract, see STAR 05 19.
N67-33443 HC$3.00 MF$0.65

AERODYNAMIC CHARACTERISTICS OF A LARGE-SCALE V/STOL TRANSPORT MODEL WITH LIFT AND LIFT -CRUISE FANS.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
For primary bibliographic entry see Field 1C.
For abstract, see STAR 05 19.
N67-33454 HC$3.00 MF$0.65

DOUBLE-DRIVER SHOCK TUBE FOR SHOCK-ON-SHOCK SIMULATION.
Aeronautical Research Inst. of Sweden, Stockholm.
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 19.
N67-33520 HC$3.00 MF$0.65

IONIZED-WAKE INVESTIGATION IN HOT-SHOT WIND- TUNNELS.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 19.
N67-33641 HC$3.00 MF$0.65

SOME SPECTRAL FUNCTIONS COMPATIBLE WITH HEISENBERG'S THEORY IN AXISYMMETRIC TURBULENCE.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 20D.
For abstract, see STAR 05 19.
N67-33662 HC$3.00 MF$0.65

AERODYNAMIC CHARACTERISTICS OF THREE AXISYMMETRIC LOW FINENESS RATIO REENTRY SHAPES AT MACH 6.9.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
P. T. Bernot, and J. A. Penland. Aug 67, 36p NASA-TN-D-4122
Contract 124-07-02-57-23
Refs

Descriptors: *Aerodynamic characteristics, *Axisymmetric body, *Low fineness ratio, *Reentry body, Aerodynamic, Afterbody, Alteration, Analysis, Angle of attack, Axisymmetry, Body, Center, Characteristics, Control, Determination, Down, Edge, Flap, Force, Location, Moment, Newton theory, Pitch, Pressure, Range, Reentry, Shift, Stability, Trailing, Trim, Wide.

For abstract, see STAR 05 19.
N67-33876 HC$3.00 MF$0.65

EFFECTS OF CONFIGURATION MODIFICATIONS ON AERODYNAMIC CHARACTERISTICS OF TENSION SHELL SHAPES AT MACH 3.0.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
W. D. Deveikis, and J. W. Sawyer. Aug 67, 38p NASA-TN-D-4080
Contract 124-08-06-03-23

Descriptors: *Aerodynamic characteristics, *Flow separation, *Shell stability, Aerodynamic, Angle of attack, Characteristics, Configuration, Flow, Hypersonic, Modification, Reynolds number, Separation, Shape, Shell, Speed, Stability, Static, Tension.

For abstract, see STAR 05 19.
N67-33995 HC$3.00 MF$0.65

1B. Aeronautics

HUMAN FACTORS IN AVIATION: SOME RECURRENT PROBLEMS AND NEW APPROACHES,
George Washington Univ Alexandria Va Human Resources Research Office
For primary bibliographic entry see Field 5I.
AD-656 971 HC$3.00 MF$0.65

ECONOMIC AND TECHNICAL FEASIBILITY ANALYSIS OF ESTABLISHING AN ALL-WEATHER V/STOL TRANSPORTATION SYSTEM.
Federal Aviation Administration Washington D C Systems Research and Development Service
For primary bibliographic entry see Field 1C.
AD-657 330 HC$3.00 MF$0.65

DIRECT OPERATING COSTS AND OTHER PERFORMANCE CHARACTERISTICS OF TRANSPORT AIRCRAFT IN AIRLINE SERVICE: CALENDAR YEAR 1962.
Federal Aviation Agency Washington D C Office of Policy Development
Aug 63, 29p

Descriptors: (*Civil aviation, Costs), (*Transport planes, Costs), Jet transport planes, Operation, Performance (Engineering), Maintenance, Fuel consumption, Transportation, Helicopters.

The report was prepared to meet a requirement within the Federal Aviation Agency for a brief reference document containing measures of aircraft operating costs, and of certain other aircraft performance, achieved in recent airline service. It is designed specifically to show, for the various types of airline aircraft, data on utilization, seating capacities, airborne speeds, fuel consumption and average stage lengths, as well as data on operating costs and the major elements thereof, such as maintenance and depreciation.
AD-657 437 HC$3.00 MF$0.65

RADIOISOTOPE TAXI GUIDANCE SYSTEM. PHASE II. FABRICATION AND INSTALLATION.
Parametrics Inc Waltham Mass
For primary bibliographic entry see Field 17G.
AD-657 442 HC$3.00 MF$0.65

IN THE PREDICTION OF THE NEAR FIELD NOISE OF SUPERSONIC JETS.
Wyle Labs., Inc., Huntsville, Ala.
For primary bibliographic entry see Field 20A.
For abstract, see STAR 05 19.
N67-33460 HC$3.00 MF$0.65

1C. Aircraft

REVIEW OF THE ECONOMIC FEASIBILITY REPORT FOR THE SST AND SUPPORTING MATERIALS.
Charles River Associates Inc Cambridge Mass
13 Apr 67, 130p Rept no. 122-1
Contract FA-SS-67-18

Descriptors: (*Supersonic planes, Cost effectiveness), (*Transport planes, Cost effectiveness), Air traffic, Economics, Feasibility studies, Management planning, Predictions.
Identifiers: Supersonic transport aircraft.

The review focuses on the aggregate demand for air travel in the period to 1990 and the demand for SST's in the same period. An outline is given of the use of the IDA aggregate demand forecast. A description is given of the assumptions made in the application of a pricing decision methodology to the forecast of aircraft demand. Incidental findings are presented resulting from application of the RAC formulas to the problem of forecasting aircraft demand.
AD-656 935 HC$3.00 MF$0.65

PERFORMANCE OF THE SUPPORT SYSTEMS ABOARD THE DME-A SATELLITE, 29 NOV. 1965-FEB. 1967.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 22B.
AD-657 156 HC$3.00 MF$0.65

TACTICAL SUPPORT TRANSPORT AIRCRAFT STUDY.
Marine Corps Washington D C
14 Aug 67, 174p

Descriptors: (*Transport planes, Military requirements), Decision making, Tactical air support, Marine Corps, Cost effectiveness.

The study identifies the TacticalSupport Transport (TST) aircraft mission and provides support for selection of a new TST aircraft program to replace the C117/47/54. It concisely presents the cost effectiveness advantages in retaining the TST aircraft organic to the Marine Corps. It recommends recognition of the TST mission and retention of the current C117/47/54 aircraft to perform the TST mission until a suitable replacement aircraft can be orderly programmed. (Author)
AD-657 195 HC$3.00 MF$0.65

EFFECTS OF GUST VELOCITY SPATIAL DISTRIBUTIONS ON LATERAL-DIRECTIONAL RESPONSE OF A VTOL AIRCRAFT.
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 1A.
AD-657 321 HC$3.00 MF$0.65

ECONOMIC AND TECHNICAL FEASIBILITY ANALYSIS OF ESTABLISHING AN ALL-WEATHER V/STOL TRANSPORTATION SYSTEM.
Master's thesis,
Federal Aviation Administration Washington D C Systems Research and Development Service
Joseph M. Del Balzo. May 67, 141p Rept no. FAA-RD-67-36
Prepared in cooperation with Drexel Inst. of Tech., Philadelphia, Pa.

Descriptors: (*Helicopters, All-weather aviation), (*Air transportation, Feasibility studies), Economics, Navigation, Short take-off planes, Air traffic, Airports, Costs.

The need and potential of an aircraft having vertical and/or short take off and landing capability (V/STOL) is considered. The technical and economic feasibility of establishing an all weather V/STOL transportation system is explored. Traffic forecasts for the V/STOL for the years 1968 through 1980 are postulated. The enroute, terminal, and approach and landing navigation system requirements for the V/STOL are analyzed. Anticipated operating costs and revenue, based on an analysis of the New York-Boston air shuttle route, are presented. (Author)
AD-657 330 HC$3.00 MF$0.65

EVALUATION OF IMPROVED T-39 BRAKE, GOODYEAR P/N 9550338.
Engineering test rept.
Ogden Air Materiel Area Hill AFB Utah Directorate Materiel Management
Jun 67, 30p

Descriptors: (*Aircraft, *Brakes), Aircraft landings, Flight testing, Design, Wear resistance, Pistons, Specifications, Costs, Safety, Tests.

OONR reported the T-39 organic brake, P/N 9541626, wear life of 35-40 landings was unsatisfactory. OONER proposed an improved design tri-metallic brake, P/N 9550338, for the T-39. To allow early evaluation, prototypes of the proposed brakes were utilized to obtain an estimation of service life improvement. The prototype brake, P/N 5E5-124, lasted for 486 landings, before the wearout limit was obtained. Two production brakes P/N 9550338 were then available. The production brakes were tested and 517 landings were obtained before removal for wear. (Author)
AD-657 385 HC$3.00 MF$0.65

A METHOD OF INCREASING THE MANEUVERABILITY OF HIGH SPEED AIRCRAFT WITHIN THE LIMITS OF HUMAN TOLERANCE TO g FORCES,
Psychological Corp New York
J. E. Barmack, and John D. Coakley. 6 Feb 47, 69p
SPECDEVCEN-151-1-11
Contract N6-ori-161-01

Descriptors: (*Aircraft, Maneuverability), (*Tolerances (Physiology), *Deceleration), Gravity, Human engineering, Flight paths, Pilots.

The purpose of the report is to determine in a preliminary way some of the advantages and disadvantages of employing deceleration to improve maneuverability.
AD-657 449 HC$3.00 MF$0.65

A STUDY OF THE MOVING FIGURE AND ORIENTATION OF SYMBOLS ON PICTORIAL AIRCRAFT INSTRUMENT DISPLAYS FOR NAVIGATION.
Illinois Univ Urbana Dept of Psychology
For primary bibliographic entry see Field 5E.
AD-657 470 HC$3.00 MF$0.65

EVALUATION OF THE SCHOOL LINK AS AN AID IN TEACHING GROUND REFERENCE MANEUVERS.
Illinois Univ Urbana Dept of Psychology
For primary bibliographic entry see Field 5J.
AD-657 473 HC$3.00 MF$0.65

THE EFFECT OF HEAT UPON THE PERFORMANCE OF MEN IN HIGH SPEED AIRCRAFT: A CRITICAL REVIEW,
Psychological Corp New York
For primary bibliographic entry see Field 5J.
AD-657 482 HC$3.00 MF$0.65

LOW-SPEED WIND-TUNNEL INVESTIGATION OF TENSION-STRUCTURE PARAWINGS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
P. G. Fournier, and R. L. Naeseth. Jun 67, 191p NASA-TN-D-3940
Contract 126-13-01-58-23

Descriptors: *Lateral stability and control, *Longitudinal stability and control, *Parawing, Aerodynamic, Characteristics, Control, Fabric, Flexible, Lateral, Longitudinal, Nonporous, Planform, Stability, Static, Structure, Tension, Variation.

For abstract, see STAR 05 19.
N67-32747 HC$3.00 MF$0.65

COMPLIATION OF PAPERS SUMMARIZING SOME RECENT NASA RESEARCH ON MANNED MILITARY AIRCRAFT.
National Aeronautics and Space Administration, Washington, D. C.
Oct 60, 177p NASA-TM-X-420

Descriptors: *Aircraft design, *Manned aircraft, *Military aircraft, *Propulsion system, *Supersonic flight, Aerodynamics, Air, Aircraft, Breathing, Compilation, Design, Flight, Hypersonic, Manned, Material, Military, Noise, Propulsion, Research, Simulation, Structure, Supersonic, Sweep, System, V/stol, Variable, Vtol, Wing, X-15 aircraft.

For abstract, see STAR 05 19.
N67-33070 HC$3.00 MF$0.65

AERODYNAMIC CHARACTERISTICS OF A LARGE-SCALE V/STOL TRANSPORT MODEL WITH LIFT AND LIFT-CRUISE FANS.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
L. P. Hall, D. H. Hickey, and J. V. Kirk. Aug 67, 88p NASA-TN-D-4092
Contract 721-03-00-06-00-21

Descriptors: *Aerodynamic characteristics, *Lift fan, *V/stol aircraft, Aerodynamic, Aircraft, Characteristics, Configuration, Cruise, Direction, Fan, Instability, Lift, Model, Propulsion, Rotation, Transport, Tunnel, Turbofan, V/stol, Wind.

For abstract, see STAR 05 19.
N67-33454 HC$3.00 MF$0.65

STATIC STABILITY CHARACTERISTICS AT MACH NUMBERS FROM 1.90 TO 4.63 OF A 76 DEG SWEPT ARROW WING MODEL WITH VARIATIONS IN HORIZONTAL-TAIL HEIGHT, WING HEIGHT, AND DIHEDRAL.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
D. E. Fuller. Aug 67, 117p NASA-TN-D-4076
Contract 126-13-02-04-23
Refs

Descriptors: *Aircraft model, *Arrow wing, *Dihedral effect, *Horizontal tail, *Static stability, Aircraft, Angle of attack, Arrow, Characteristics, Dihedral, Direction, Effect, Flow, Height, Horizontal, Lateral, Longitudinal, Mach number, Model, Moment, Nonlinearity, Pitch, Region, Sideslip, Stability, Static, Swept wing, Tail, Wing.

For abstract, see STAR 05 19.
N67-33875 HC$3.00 MF$0.65

AN AUTOMATIC THREE-DIMENSIONAL MODELS MEASURING MACHINE IN R.A.E. WORKSHOPS.
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 19.
N67-33987 HC$3.00 MF$0.65

1D. Aircraft Flight Control and Instrumentation

AN INVESTIGATION OF AERODYNAMIC CONTROLS AT HYPERSONIC MACH NUMBERS.
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-657 285 HC$3.00 MF$0.65

FREE-STREAM INTERFERENCE EFFECTS ON EFFECTIVENESS OF CONTROL JETS NEAR THE WING TIP OF A VTOL AIRCRAFT MODEL.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
K. P. Spreemann. Aug 67, 60p NASA-TN-D-4084

Descriptors: *Air, *Free stream effect, *Vtol aircraft, *Wing tip control, Aileron, Control, Deflection, Effect, Effectiveness, Free, Interference, Jet, Model, Roll, Speed, Stream, Tip, Transition, Wing.

For abstract, see STAR 05 19.
N67-32845 HC$3.00 MF$0.65

INVESTIGATION OVER MOVING GROUND PLANE OF A TRANSPORT AIRPLANE MODEL USING BLOWING OVER FLAPS FOR BOUNDARY-LAYER CONTROL.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
R. D. Vogler. Aug 67, 86p NASA-TN-D-4083
Contract 721-01-00-16-23

Descriptors: *Aerodynamic characteristics, *Boundary layer control, *Ground effect, *Transport aircraft, Aerodynamic, Aircraft, Angle of attack, Blowing, Boundary, Characteristics, Control, Effect, Flap, Ground, Jet, Layer, Low speed, Model, Momentum, Moving, Plane, Range, Thrust, Transport.

For abstract, see STAR 05 19.
N67-33254 HC$3.00 MF$0.65

A MANUAL ABORT GUIDANCE TECHNIQUE WITH CONCENTRIC FLIGHT PLAN RENDEZVOUS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
E. L. Anglin. Aug 67, 36p NASA-TN-D-4077

Descriptors: *Aircraft control, *Recovery, *Spin dynamics, Aircraft, Configuration, Control, Delta, Dynamics, Extrapolation, Interpolation, Magnitude, Moment, Prediction theory, Spin, Supersonic, Sweptback wing, Wing.

For abstract, see STAR 05 19.
N67-33457 HC$3.00 MF$0.65

2. AGRICULTURE

2B. Agricultural Economics

AGRICULTURE IN THE INDUSTRIALIZATION OF COMMUNIST CHINA AND THE SOVIET UNION: A COMMENT,
Rand Corp Santa Monica Calif
Nancy Nimitz. Aug 67, 8p Rept no. P-3654
Availability: Published in Journal of Farm Economics 8p Dec 1967.

Descriptors: (*Agriculture, Economics), Industrial production, Costs, Labor, Commerce, Standards, Procurement, Wages, Cereals, Reliability.

A satisfactory agricultural policy is one that achieves satisfactory performance at the lowest net cost to the industrial sector. Where output is initially high, the requisite surplus can be obtained (at least over some critical period) merely by increasing the rate of extraction; output may even fall. Where initial output is low, policy must combine extraction and developmental (output-increasing) measures in such a way as to bring the surplus up to industry's requirements as soon as possible. With this formulation, too, there will be no disagreement. However, it is clear that in the second case agriculture may remain a bottleneck for many years even if policy is optimal; hence tests of constraint, to be useful in evaluating a policy of mixed extraction and development, must be sensitive enough to reveal changes in the size of the bottleneck over time.
AD-657 491 Not available from CFSTI.

2E. Animal Husbandry

NOSEMATOSIS: REPORT OF A CANINE CASE IN THE REPUBLIC OF SOUTH AFRICA,
Armed Forces Inst of Pathology Washington D C Geographic Pathology Div
P. A. Basson, R. M. McCully, and W. E. J. Warnes. 1967, 7p
Availability: Published in J. S. Afr. Vet. Med. Ass. v37 n1 p3-9 1966.

Descriptors: (*Protozoa, Diseases), (*Dogs, Infectious diseases), Biopsy, Blindness, Musculoskeletal system, Convulsive disorders, Spores, Pathology, Thrombosis, Hemorrhage, Parasitic diseases, Diagnosis, Brain, Kidneys, Liver, Spleen, Union of South Africa, Veterinary medicine.
Identifiers: Nosematosis.

The first case of nosematosis of dogs in the Republic of South Africa is reported. The most significant clinical features of the disease were blindness, ataxia and convulsions. The pathological changes included meningo-encephalitis with microgranulomas and glial nodules, associated with extensive thrombosis and haemorrhage; interstitial nephritis and focal granulomatous hepatitis. The spores of an organism identical to Nosema cuniculi were demonstrated in some of the lesions in the brain, kidneys, liver and spleen. (Author)
AD-656 849 Not available from CFSTI.

COMMON SKIN NEOPLASMS OF DOMESTIC ANIMALS,
Armed Forces Inst of Pathology Washington D C
James E. Cook. 1967, 3p
Availability: Published in Southern Medical Journal n6 p627-9 Jun 1967.

Descriptors: (*Neoplasms, Animals), Veterinary medicine, Etiology, Diagnosis, Cancer, Bovines, Dogs, Cats, Skin.

Skin neoplasms of domestic animals arise largely from the epidermis, tubular glands, and hair follicles. Infectious verrucae occur most frequently in young calves and dogs and usually disappear spontaneously, leaving a reasonable degree of immunity. Benign squamous and fibrous papillomas are observed in mature animals. Basal cell carcinomas are sometimes called by a name indicating the predominant adnexal structure, such as the sebaceous elements or hair follicle components. Most of the basal cell tumors have been found on the heads of dogs and cats. The prognosis is generally favorable. Squamous cell tumors are usually of low malignancy and tend to form at cutaneous-mucous membrane junctions. They occur with relatively high frequency in horses and in cattle, particularly Herefords. Neoplasms of sweat glands tend to be classified separately from basal cell carcinomas in domestic animals and are more likely to metastasize than basal cell carcinomas. Tumors of the circumanal gland are neoplasms of older dogs, usually male, and are likely to be benign. Melanomas of the cutaneous regions of domestic animals in general lack evidence of origin in the epidermis, but the oral melanoma of the dog is believed comparable to melanoma as observed in man. (Author)
AD-656 851 Not available from CFSTI.

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

THE PECULIAR NEBULA NGC 6302,
California Univ Berkeley Radio Astronomy Lab
R. Minkowski, and Hugh M. Johnson. 28 Nov 66, 6p
Prepared in cooperation with Lockheed Missiles and Space Co., Palo Alto, Calif.
Availability: Published in Astrophysical Journal v148 p659-62 May 1967.

Descriptors: (*Nebulae, Photointerpretation), Interstellar matter, Motion, Brightness, Models (Simulations), Stars, Spectra (Visible + ultraviolet).
Identifiers: NGC 6302.

This publication draws attention to NGC 6302 as being a rather peculiar nebula. Included are photographs, and a grid of radial velocity distributions for points of the nebula whose relative positions are well determined.
AD-657 067 Not available from CFSTI.

PROGRAM SOLUTIONS TO SPACE SCIENCE PROBLEMS,
International Business Machines Corp Cambridge Mass Cambridge Advanced Space Systems Dept
For primary bibliographic entry see Field 9B.
AD-657 333 HC$3.00 MF$0.65

SPECIFICATIONS FOR THE CASSEGRAIN INSTRUMENTS INCLUDING THE CASSEGRAIN OBSERVING PLATFORM, STEWARD OBSERVATORY 90-INCH TELESCOPE.
Technical rept.,
Arizona Univ Tucson Optical Sciences
A. B. Meinel. Feb 67, 53p Rept no. TR-16

Descriptors: (*Astronomical observatories, Instrumentation), (*Instrumentation, Specifications), Telescopes, Instruction manuals, Structures, Photographic equipment, Mirrors, Photometers, Collimators, Images, Spectrographic cameras, Cameras, Diffraction, Diffraction gratings, Exposure meters, Design.

The document has been prepared to form the basis for the operational specifications for the Cassegrain instrumentation for the 90-inch telescope of the Steward Observatory. The publication of this document is for the purpose of providing guidance to other astronomical groups who may have use for the considerations recorded herein. (Author)
AD-657 452 HC$3.00 MF$0.65

ON THE STRUCTURE OF THE SATURNIAN RINGS.
Royal Inst. of Tech., Stockholm (Sweden). Div. of Plasma Physics.
H. Alfven. Jun 67, 17p REPT.-67-09

Descriptors: *Planetary origin, *Ring structure, *Saturn (planet), Asteroid, Cosmogony, Magnetosphere, Origin, Planetary, Resonance, Ring, Satellite, Structure, Theory.

For abstract, see STAR 05 19.
N67-33418 HC$3.00 MF$0.65

SCIENTIFIC HORIZONS FROM SATELLITE TRACKING.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
H. D. Friedman, and C. A. Lundquist. 30 Dec 66, 257p NASA-CR-87302, SAO SPECIAL REPT.-236
Grant NSG-87-60, Contract NSR-09-015-018

Descriptors: *Conference, *Geoastrophysics, *Satellite tracking, Atmosphere, Computer, Continent, Drift, Earth, Effect, Geopotential, Laser, Lunar, Motion, Observation, Oceanography, Orbit, Program, Range, Relativity, Rotation, Satellite, Spin, Theory, Tracking, Upper.

For abstract, see STAR 05 19.
N67-33665 HC$3.00 MF$0.65

PARTIAL COROTATION OF A MAGNETIZED PLASMA.
Royal Inst. of Tech., Stockholm (Sweden). Div. of Plasma Physics.
H. Alfven. May 67, 17p REPT.-67-08

Descriptors: *Asteroid, *Magnetoplasma, *Rotating plasma, *Saturn (planet), Angular, Condensation, Cosmogony, Dipole, Electric, Field, Magnetic, Magnetohydrodynamics, Magnetosphere, Momentum, Plasma, Rotat n, Velocity.

For abstract, see STAR 05 19.
N67-33961 HC$3.00 MF$0.65

SURVEY OF THE REGION OF I LACERTA.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. Burley, and G. Coyne. Feb 67, 41p NASA-TM-X-55718, X-641-67-20

Descriptors: *A star, *O star, *Star cluster, Association, Astronomy, Classification, Concentration, Distance, Distribution, Evolution, Magnitude, Photometry, Region, Survey.

For abstract, see STAR 05 19.
N67-33980 HC$3.00 MF$0.65

3B. Astrophysics

COSMIC RAY OBSERVATIONS IN 1964-1965 WITH MARINER IV,
Iowa Univ Iowa City Dept of Physics and Astronomy
S. M. Krimigis. Jun 67, 17p Rept no. 67-26
Contract Nonr-1509 (06)
Presented at the International Conference on Cosmic Rays, Alberta Univ., Calgary, 19-30 Jun 1967.

Descriptors: (*Space environmental conditions, *Cosmic rays), (*Space probes, Space environmental conditions), Solar radiation, Protons, Electrons, Radiation measurement systems, Neutron detectors.
Identifiers: Mariner.

The University of Iowa equipment on Mariner IV, which was launched towards Mars on 28 November 1964, consists in part of two thin window GM tubes sensitive to electrons of Ee approximately equal to, or > 40 keV (Det B) and Ee approximately equal to, or > 45 keV (Det A), and a shielded GM tube (Det C) sensitive to electrons of Ee > 150 keV and having a threshold of about 55 MeV for omnidirectional protons. Observations over the period 28 November 1964 to 30 September 1965 have shown the following: (a) Electrons in the energy range 0.40 = or < Ee < 150 keV were present in the interplanetary medium prior to day 12, 1965 with intensities of about 0.5/(cm2 sec sr). (b) The interplanetary cosmic ray gradient for protons of Ep approximately equal to, or > 430 MeV was less than 3 per cent per AU and that the data are consistent with zero gradient. (c) There are large changes in the intensities of protons of Ep approximately equal to, or > 55MeV, but the direction and magnitude of the gradient for such protons were uncertain during solar minimum. The implications of these results are discussed. (Author)
AD-656 916 HC$3.00 MF$0.65

EXCHANGE CONTRIBUTION IN THE SCATTERING OF ELECTRONS BY ATOMS AND POSITIVE IONS,
Joint Inst for Lab Astrophysics Boulder Colo
For primary bibliographic entry see Field 7D.
AD-656 958 Not available from CFSTI.

THE SPECTRAL REFLECTANCE OF WATER AND CARBON DIOXIDE CRYODEPOSITS FROM 0.36 TO 1.15 MICRONS.
Arnold Engineering Development Center Arnold Air Force Station Tenn
For primary bibliographic entry see Field 20F.
AD-657 018 HC$3.00 MF$0.65

STRENGTHS, WIDTHS, AND SHAPES OF THE LINES OF THE 3nu CO BAND.
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
For primary bibliographic entry see Field 7D.
AD-657 114 HC$3.00 MF$0.65

ABSORPTION BY CO2 BETWEEN 7125 AND 8000/cm (1.25-1.40 MICRONS).
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
For primary bibliographic entry see Field 7D.
AD-657 116 HC$3.00 MF$0.65

THE SOLAR X-RAY FLARE OF 7 JULY 1966,
Iowa Univ Iowa City Dept of Physics and Astronomy
J. A. Van Allen. Jul 67, 36p Rept no. 67-35
Contracts Nonr-1509 (06), NAS5-9076

Descriptors: (*Solar flares, X rays), Scientific satellites, Geiger counters, Cosmic rays, Space environmental conditions, Solar disturbances, Radiation measurement systems.

By means of a mica window Geiger-Mueller tube on earth satellite Explorer 33, a major solar x-ray flare was observed with 81.8 sec time resolution on 7 July 1966. The flare had its onset at 00:23, its maximum intensity at 00:42, and a total duration of 200 minutes. The maximum energy flux was 0.03 ergs/sq cm sec and the time integrated flux was 97 ergs/sq cm (2 < lambda < 12 deg. A). Assuming equal intensity over 2 pi-steradians at the sun, the total emission in this wave length band was 1.4 x 10 to the 29th power ergs and the maximum surface luminosity of the sun was 2.9 x 10 to the 6th power ergs/sq cm sec or 4.5 x 10 to the -5 power of the whole radiant luminosity of the average solar surface. Charged particles began to arrive at the satellite at 00:58, or 35 minutes after the first detection of the x-ray enhancement, and remained in the interplanetary system for at least ten days thereafter. The intensity-time curve of the soft x-rays is compared with those of 2700 MHz solar radio noise flux and of ionospheric absorption at 22 MHz as observed at Penticton. (Author)
AD-657 186 HC$3.00 MF$0.65

A MANIFOLD OF PERIODIC ORBITS,
Boeing Scientific Research Labs Seattle Wash Mathematics Research Lab
For primary bibliographic entry see Field 20K.
AD-657 341 HC$3.00 MF$0.65

NON-AXISYMMETRIC DIFFERENTIAL MOTIONS IN GALAXIES HAVING AXISYMMETRIC MASS DISTRIBUTIONS.
Technical rept.,
Chicago Univ Ill
Peter O. Vandervoort. 2 Nov 66, 6p Rept no. TR-1
Contract N00014-67-C-0260
Rept. on Investigations in Stellar Dynamics.
Availability: Published in The Astrophysical Journal, v147 n1 p384-8 Jan. 1967.

Descriptors: (*Galaxies, Motion), Stars, Gravity, Velocity, Momentum, Distribution functions, Rotation, Mathematical analysis, Dynamics.

In the many investigations in stellar dynamics which deal with systems having axisymmetric, time-independent mass distributions, the only differential motion commonly considered is rotation. This letter considers non-axisymmetric differential motions in such systems. The tendency to overlook or ignore these more general motions in the past has probably resulted from the prevalence of an intuitive feeling that departures from pure rotation could not occur except in conjunction with departures of the density from axisymmetry or time independence.
AD-657 386 Not available from CFSTI.

NITROGEN LINES IN THE INFRARED FRAUNHOFER SPECTRUM,
Liege Univ Cointe-Sclessin (Belgium) Institut D'Astrophysique
J. W. Swensson. 1966, 13p
AFCRL-67-0479
Contract AF 61 (052)-685
Availability: Published in Bulletin de l'Academie Royale de Belgique (Classe des Sciences) p1306-17 Nov 5 1966.

Descriptors: (*Solar spectrum, Nitrogen), (*Nitrogen, *Infrared spectroscopy), Spectra (Infrared), Line spectrum, Electron transitions, Tables, Belgium.

The laboratory investigations by Eriksson and by Eriksson and Johansson of the infrared arc spectrum of nitrogen constitute in part the basis for a discussion of the spectroscopic evidence for the presence of nitrogen in the sun. The solar material consists mainly of measurements of high-resolu-

tion spectrophotometric records of the Fraunhofer spectrum obtained by L. Delbouille and G. Roland. These data have been supplemented by the information furnished by the solar tables prepared by Babcock and Moore and by Mohler. A table giving laboratory and solar data pertaining to the leading N I multiplets lists 38 lines that have been referred wholly or partly to nitrogen atoms in the atmosphere of the sun. Twenty-eight of the N I identifications are new, but four of these are subject to varying degrees of doubt. The maximum excitation potential for nitrogen lines in the solar spectrum is found to be 12.36 e.v., which is 0.6 e.v. higher than the value previously supposed. (Author)
AD-657 507 Not available from CFSTI.

THE SOLAR SPECTRUM IN THE 5577 AND 6300 A REGIONS.
Liege Univ Cointe-Sclessin (Belgium) Institut D'Astrophysique
G. Roland, and L. Delbouille. 21 Dec 66, 5p
AFCRL-67-0478
Contract AF 61 (052)-955
Availability: Published in Planet. Space Sci v15 p945-9 1967.

Descriptors: (*Solar spectrum, Oxygen), Solar radiation, Scintillation, Line spectrum, Spectrometers, Photomultipliers.

The report contains graphs showing recent measurements of the solar spectrum in the region of the forbidden oxygen lines at 5577 and 6300 A.
AD-657 511 Not available from CFSTI.

A FEASIBILITY STUDY OF AN EXPERIMENT FOR DETERMINING THE PROPERTIES OF THE MARS ATMOSPHERE. VOLUME I - SUMMARY.
Avco Corp., Lowell, Mass.
S. Georgiev. Jul 67, 141p NASA-CR-530
Contract NAS2-2970

Descriptors: *Mars probe, *Planetary atmosphere, *Spacecraft design, Atmosphere, Control, Density, Design, Planetary, Pressure, Probe, Profile, Propulsion, Separation, Spacecraft, Sterilization, Telecommunication, Temperature, Thermal.

For abstract, see STAR 05 19.
N67-32719 HC$3.00 MF$0.65

PROBABLE OBSERVATIONS OF THE GEOMAGNETIC TAIL AT 103 R E BY PIONEER 7.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
S. C. Cantarano, N. F. Ness, and C. S. Scearce.
Apr 67, 26p NASA-TM-X-55863, X-612-67-183

Descriptors: *Geomagnetic field, *Pioneer vii space probe, *Solar wind, Earth, Field, Fluctuation, Force, Geomagnetic, Interaction, Line, Observation, Particle, Plasma, Solar, Tail, Wake, Wind.

For abstract, see STAR 05 19.
N67-32757 HC$3.00 MF$0.65

THEORETICAL COMPUTATIONS OF THE OUTGOING INFRARED RADIANCE FROM A PLANETARY ATMOSPHERE.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
V. G. Kunde. Aug 67, 121p NASA-TN-D-4045

Descriptors: *Computer program, *Earth atmosphere, *Infrared radiation, *Mars atmosphere, Atmosphere, Calculation, Computer, Earth, Infrared, Interpretation, Mars (planet), Measurement, Planetary, Program, Radiation, Satellite, Theoretical.

For abstract, see STAR 05 19.
N67-32936 HC$3.00 MF$0.65

ON VON ZEIPEL'S METHOD IN GENERAL PLANETARY THEORY.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
J. Meffroy. 30 Nov 66, 85p NASA-CR-87298, SAO SPECIAL REPT.-229
Grant NSG-87-60

Descriptors: *Planetary motion, *Von zeipel method, Earth, Equation, Hamiltonian, Jupiter (planet), Mars, Motion, Perturbation, Planetary, Saturn (planet), Theory.

For abstract, see STAR 05 19.
N67-33016 HC$3.00 MF$0.65

ON THE DISTRIBUTION OF THE GIBEON METEORITES OF SOUTHWEST AFRICA.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
R. Citron. 30 Mar 67, 41p NASA-CR-87297, SAO SPECIAL REPT.-238
Grant NSG-87-60

Descriptors: *Africa, *Meteor shower, Crater, Distribution, Impact, Map, Mass, Meteor, Shower, South, Weight, West.

For abstract, see STAR 05 19.
N67-33017 HC$3.00 MF$0.65

PLASMA PHYSICS IN AN ASTROPHYSICAL ENVIRONMENT FINAL SCIENTIFIC REPORT, 15 NOV. 1965 - 14 NOV. 1966.
London Univ. (England). King's Coll.
I. W. Roxburgh. Dec 66, 12p AFCRL-67-0195, AD-653211
Contract AF 61/052/-908

Descriptors: *Binary star, *Magnetic field, *Plasma physics, Astrophysics, Binary, Decay, Eigenvalue, Environment, Field, Fission, Instability, Magnetic, Model, Oscillation, Physics, Plasma, Rotation, Simulation, Stability, Star, Structure.

For abstract, see STAR 05 19.
N67-33032 HC$3.00 MF$0.65

BALANCED FILTERS FOR THE ANALYSIS OF AL, SI, K, CA, FE, AND NI.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 19.
N67-33229 HC$3.00 MF$0.65

ULTRAVIOLET CALIBRATION PROCEDURES FOR GEMINI EXPERIMENT M-407.
National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.
J. E. Novotny, and R. C. Stokes. Jul 67, 35p
NASA-TM-X-58009
Contract 923-50-10-06-72

Descriptors: *Albedo, *Gemini 11 mission, *Lunar surface, *Spectral reflectance, *Ultraviolet spectrograph, Absorption, Air, Lunar, Mirror, Monochromator, Photomultiplier, Radiometer, Reflection, Spectral, Spectrograph, Surface, Ultraviolet.

For abstract, see STAR 05 19.
N67-33422 HC$3.00 MF$0.65

ON THE COLLECTION OF COSMIC DUST SAMPLES FOR CRYSTALLOGRAPHIC STUDY.
Stockholm Univ. (Sweden). Inst. of Meteorology.
For primary bibliographic entry see Field 22B.

For abstract, see STAR 05 19.
N67-33521 HC$3.00 MF$0.65

ON THE ORIGIN OF COSMIC RAYS.
O Proiskhzhdenii Kosmicheskikh Luchey
Volt Technical Corp., Washington, D. C.
V. L. Ginzburg, and S. I. Syrovatskiy. 8 Aug 67, 22p NASA-CR-87183, ST-CR-IGA-10634
Contract NAS5-12487
Transl. Into English of A Paper Presented At the 10th Intern. Conf. on Cosmic Rays, Calgary, Canada, Jun. 1967

Descriptors: *Cosmic ray, *Galactic evolution, *Origin, Astronomy, Cosmic, Disk, Energy, Evolution, Expression, Galaxy, Halo, Metagalaxy, Model, Nonstationary, Ray, Temperature, Uniform.

For abstract, see STAR 05 19.
N67-33832 HC$3.00 MF$0.65

INTEGRATION PLAN FOR THE RADIO ASTRONOMY EXPLORER (RAE) SPACECRAFT.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 19.
N67-33853 HC$3.00 MF$0.65

ON THE ORIGIN OF THE SOLAR SYSTEM.
Royal Inst. of Tech., Stockholm (Sweden). Div. of Plasma Physics.
H. Alfven. May 67, 18p REPT.-67-07
Presented At the Roy. Astron. Soc., London, 12 May 1967

Descriptors: *Celestial mechanics, *Conference, *Magnetohydrodynamics, *Origin, *Solar system, Asteroid, Astrophysics, Celestial, Cosmogony, Galaxy, Mechanics, Physics, Planet, Plasma, Solar, System.

For abstract, see STAR 05 19.
N67-33894 HC$3.00 MF$0.65

3C. Celestial Mechanics

THE PRECESSION AND NUTATION OF DEFORMABLE BODIES II: THE FORM OF DISTORTED CONFIGURATIONS,
Boeing Scientific Research Labs Seattle Wash Mathematics Research Lab
Zdenek Kopal. Apr 67, 50p Rept no. D1-82-0611, Mathematical Note-509
Contract NASw-1470

Descriptors: (*Moon, Oscillation), (*Celestial mechanics, Oscillation), Gravity, Diurnal variations, Precession, Deformation, Viscosity, Motion, Mathematical analysis.

In the preceding report of this series the Eulerian equations for the precession and nutation of self-gravitating deformable bodies have been set up, with coefficients expressible in terms of the displacement components arising from deformation which may oscillate with the time. The aim of the present report will be to derive an explicit form of the equations which govern the deformations of self-gravitating viscous bodies in an external field of force; and to solve them in the particular case of a homogeneous compressible configuration of arbitrarily high viscosity. A possession of such a solution then opens the way for the evaluation of the coefficients of the generalized equations for the precession and nutation of deformable bodies, and to their eventual solution.
AD-657 400 HC$3.00 MF$0.65

ON THE ELIMINATION OF THE SHORT PERIOD TERMS OF A FIRST ORDER GENERAL PLANETARY THEORY THROUGH VON ZEIPEL'S METHOD.

National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. Meffroy. 9 Jun 67, 25p NASA-TM-X-55872, X-641-67-318

Descriptors: *Disturbing function, *Planetary motion, *Von zeipel method, Disturbance, Eccentricity, Equation, Function, Inclination, Motion, Period, Planetary, Short, Theory.

For abstract, see STAR 05 19.
N67-33278 HC$3.00 MF$0.65

THE POTENTIAL FUNCTION AND FIELD OF FORCE OF A SPHEROID.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. P. Murphy. Jan 67, 12p NASA-TM-X-55856, X-547-67-15

Descriptors: *Force field, *Satellite tracking, *Spheroid, Control, Coordinate, Field, Force, Formula, Function, Harmonics, Mathematics, Potential, Rectangle, Satellite, Tracking.

For abstract, see STAR 05 19.
N67-33444 HC$3.00 MF$0.65

GUIDE TO HAMILTONIAN TECHNIQUE FOR FORMULATION OF ORBITAL PROBLEMS.
European Space Vehicle Launcher Development Organization, Paris (France).
For primary bibliographic entry see Field 22C.
For abstract, see STAR 05 19.
N67-33452 HC$3.00 MF$0.65

DETERMINATION OF THE POSITION OF THE SUN ON THE BASIS OF THE MEAN SOLAR ELEMENTS.
European Space Data Centre, Darmstadt (West Germany).
H. K. Schaefer, and H. G. Walter. Nov 66, 13p CESRO-SN-10

Descriptors: *Inertial coordinate system, *Orbital element, *Solar position, Computer, Element, Ephemeris, Fortran, Geocentric, Mean, Orbital, Position, Program, Rectangle, Reference, Solar, System, Time.

For abstract, see STAR 05 19.
N67-33535 HC$3.00 MF$0.65

THREE-DIMENSIONAL NONLINEAR STABILITY ANALYSIS OF THE SUN-PERTURBED EARTH- MOON EQUILATERAL POINTS.
Rand Corp., Santa Monica, Calif.
H. B. Schechter. Jan 67, 21p NASA-CR-87312, P-3619
Grant NSG-133-61

Descriptors: *Earth-moon system, *Nonlinear equation, *Particle motion, Earth, Equation, Equilibrium, Excitation, Field, Force, Frequency, Hamiltonian, Libration, Moon, Motion, Nonlinear, Orbit, Particle, Perturbation, Point, Resonance, Solar, Stability, Sun, System.

For abstract, see STAR 05 19.
N67-33630 HC$3.00 MF$0.65

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

EXCITED-STATE FORMATION AND DESTRUCTION IN MIXTURES OF ATOMIC OXYGEN AND NITROGEN,
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 7D.
AD-656 795 Not available from CFSTI.

ION TEMPERATURE IN THE UPPER ATMOSPHERE,
California Univ San Diego La Jolla Inst for Radiation Physics and Aerodynamics
Peter M. Banks. 13 Feb 67, 24p
AROD-5133:85-P
Contract DA-31-124-ARO (D)-257, ARPA Order-0570
Availability: Published in Journal of Geophysical Research v72 n13 p3365-85 Jul 1 1967.

Descriptors: (*Ionosphere, Atmospheric temperature), (*Heat transfer, Upper atmosphere), Electrons, Atmosphere models, Terrestrial magnetism, Scattering, Ions, Atmospheric sounding.

The problem of ion temperature in the ionosphere is analyzed in terms of an energy budget that includes heating by the ambient electron gas, cooling by the different gases of the neutral atmosphere, and thermal conduction along the lines of geomagnetic force. With the introduction of the ion temperature fractional separation X, the time-dependent equation for ion temperature excluding transport effects is reduced to a form that removes the explicit dependence upon the neutral gas temperature and separates the effects of the electron and neutral gases. Adopting the appropriate aeronomic conditions, it is shown with different models of the neutral atmosphere that the ion temperature has a transitional behavior, increasing from the neutral gas temperature near 250 km toward the electron temperature above 700 km. While the ion thermal transport does not significantly affect ion temperatures below abo 500 km at midgeomagnetic latitudes, it plays an increasingly important role above this height, acting to keep the high-altitude ion temperature significantly less than the electron temperature. In addition, as a result of ion cooling in He and H, the ion temperature can decrease with altitude in the transition atmospheric regions between O and H dominance. The time constant for changes in ion temperature resulting from changes in aeronomic parameters is evaluated and found to be less than 10 minutes for altitudes below 700 km; above this altitude, conduction cooling must be considered. Finally, the theoretical expressions derived here are compared with recent ionospheric Thomson scatter data. (Author)
AD-656 960 Not available from CFSTI.

CAMBRIDGE ATMOSPHERIC DENSITY NUMERICAL INTEGRATION PROGRAM (CADNIP).
Final rept. Jun 64-May 67,
International Business Machines Corp Cambridge Mass Cambridge Advanced Space Systems Dept
Arnold S. Bramson, and Jack Slowey. Aug 67, 63p
AFCRL-67-0403
Contract AF 19 (628)-4192

Descriptors: (*Upper atmosphere, Density), (*Satellites (Artificial), Drag), (*Computer programs, Upper atmosphere), Atmosphere models, Orbital trajectories, Gravity, Perturbation theory.
Identifiers: CADNIP, Geopotential.

This report describes a series of computer programs designed to determine atmospheric density from an analysis of satellite observations. The adopted approach consists of a numerical integration procedure combined with a differential correction scheme where discrepancies between computed and observed satelli position and velocity are reconciled by adjusting the assumed atmospheric model, thereby yielding corrected or refined density data. An important advantage of this technique is its applicability to satellites entering the decay stage where the effects of atmospheric drag are considerable and where a relatively short time span of observations may be available. Numerical results and their implications along with recommendations for future research and development are presented. Finally, a complete user's manual is included as a separate appendix. (Author)
AD-657 038 HC$3.00 MF$0.65

AURORAL-ZONE GEOPHYSICAL EVENTS AND THEIR RELATIONSHIP TO THE MAGNETOSPHERE,
Stanford Univ Calif
Henry M. Morozumi. Feb 67, 13p
Grants NSF-G23817, NSF- -56
Prepared in cooperation with Tokyo Univ., (Japan), Geophysical Inst., and Lockheed Missiles and Space Co., Palo Alto, Calif., Lockheed Palo Alto Research Lab.
Availability: Published in Jare Scientific Reports Special Issue n1 p53-64 Feb 1967.

Descriptors: (*Magnetosphere, Noise (Radio)), (*Noise (Radio), Antarctic regions), Geophysics, Aurorae, Very low frequency, Diurnal variations, Scientific satellites, Electrons, Ionospheric disturbances.

Studies were made of inter-relations among VLF-ELF-ULF radio noises, ionospheric absorption, geomagnetic variations and aurora at the South Pole, Byrd and Eights Stations, Antarctica. Semidiurnal peaks in the above geophysical parameters were found: these peaks occurred within a few hours before magnetic noon and others a few hours before magnetic midnight. A geophysical event which takes place in the day sector is called a D (day) event and night sector an N (night) event. The N event is similar to AKASOFU's substorm. One N event consists of three phases called N-1, N-2 and N-3. Early in the evening the N-1 is the major part of the N event. In mid-evening, three phases co-exist. The N-3 is the dominant feature of the late evening N event. Observations made by the Injun III satellite showed that VLF hiss (main feature of the N-1) was observed at the boundary and beyond the region of trapped electrons in the dark sector. VLF chorus (main feature of N-3) was observed in the closed lines of force. From the above observations, we suggest that the physical characteristics of auroral zone are asymmetric with respect to the day-night major axis. VLF hiss and band-type aurora are the main features of the evening side (N-1). VLF chorus, ionospheric absorption, ULF and patchy and surface-like aurora are characteristics of a post-midnight region (N-3). The break-up (N-2) is the transition between N-1 and N-3. (Author)
AD-657 065 Not available from CFSTI.

AUSTRAL AND BOREAL ZONE PRECIPITATION PATTERNS FOR LOW-ENERGY PROTONS,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
J. E. Evans, E. G. Joki, R. G. Johnson, and R. D. Sharp. 1965, 16p
Availability: Published in Unidentified Journal 16p nd.

Descriptors: (*Protons, *Aurorae), Diurnal variations, Scientific satellites, Upper atmosphere, Space environmental conditions, Terrestrial magnetism, Cosmic rays, Solar wind.

Low-energy protons have been found to account for an appreciable fraction of the total particle energy precipitated in auroral zones during a 5-day period when the planetary index Kp was between 0 and 5. Data obtained October 30 to November 3, 1963, from a polar-orbiting satellite at an altitude of about 300 km show that for 119 cases of auroral zone crossings near 1:10 local time the median ratio of precipitated proton energy integrated across a zone to the precipitated electron energy integrated across the same zone was 0.14 with quartile values of 0.04 and 0.35. The values used for total proton energy are lower limits determined from the readings taken by a single proton

detector having a 4 Kev threshold. The sensitivity threshold for proton energy fluxes was 0.05 erg/sq cm sec ster. Striking longitude effects were found in the proton precipitations on the sun-side with all precipitations occurring in the afternoon auroral time, mainly between 0 degrees to 110 degrees E longitude. The night-side proton precipitations occurred mainly in zones bounded by the McIlwain L-parameters 5 and 10. The sun-side precipitations extended to higher L values for low Kp values (Kp < 3) but widened to include lower L values as Kp increased above 3. (Author)
AD-657 069 Not available from CFSTI.

LONG-TERM STUDY OF ELECTRONS TRAPPED ON LOW L SHELLS.
Revised ed.,
Lockheed Missiles and Space Co Palo Alto Calif Lockheed Palo Alto Research Lab
W. L. Imhof, J. B. Regan, and R. V. Smith. 6 Jan 67, 7p
Revision of manuscript received 1 Dec 66.
Availability: Published in Journal of Geophysical Research v72 n9 p2371-7 May 1 1967.

Descriptors: (*Van Allen radiation belt, Electrons), Upper atmosphere, Scattering, Magnetic storms, Solar disturbances, Stability, Space environmental conditions.

Measurements are presented of the trapped electron environment in a narrow region of space at the lower edge of the inner radiation belt (1.14 approximately equal or < L approximately equal or < 1.26) for the time period from October 1962 to December 1965. Fluxes decreased during this period, although pronounced variations occurred at times of major magnetic disturbances. Measured over-all decay times are relatively independent of L in this narrow region, in contrast to the sharp L dependence calculated from atmospheric scattering effects in the absence of injections. This discrepancy is particularly significant when compared with the agreement between measured and calculated decay times obtained for short quiet periods following two different magnetic storms in October-November 1963. It is concluded that other source and/or loss mechanisms, perhaps associated with L-shell diffusion, must exist in this low L-shell region in addition to atmospheric scattering and the cumulative effects of major magnetic redistributions. Although much can be learned from measurements performed in association with natural perturbations in the trapped flux, major events of this type appear to be relatively rare and are not likely to produce precisely controlled experiments. Therefore, it is suggested that a practical and preferable method of investigating the behavior of electrons in this region is by the controlled artificial injection of electrons at relatively low intensities. (Author)
AD-657 073 Not available from CFSTI.

STRENGTHS, WIDTHS, AND SHAPES OF THE LINES OF THE 3nu CO BAND.
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
For primary bibliographic entry see Field 7D.
AD-657 114 HC$3.00 MF$0.65

ABSORPTION BY CO2 BETWEEN 1800 AND 2850/cm (3.5-5.6 MICRONS).
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
For primary bibliographic entry see Field 7D.
AD-657 115 HC$3.00 MF$0.65

SHORT-PERIOD OSCILLATIONS IN THE EARTH'S ELECTROMAGNETIC FIELD.
APL library bulletin translations series,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
P. A. Vinogradov. 6 Jun 67, 25p Rept no. TG-230-T-524
TT-67-62663
Contract NOw-62-0604
Trans. of mono. Issledovaniya po Geomagnetizmu i Aeronomii, Moscow, 1966 p256-67.

Descriptors: (*Electromagnetic fields, Oscillation), (*Ionospheric disturbances, Oscillation), Diurnal variations, Auroral, Magnetosphere, Bremsstrahlung, Electrons, Protons, Magnetic storms, Whistlers, USSR, Solar disturbances.

Short-period oscillations of the earth's electromagnetic field with periods of 1-500 sec are of two basic types: regular, almost-sinusoidal oscillations of a persistent nature, and irregular, erratic oscillations. Some regularities are established for changes in the period spectrum of these oscillations as a function of storm intensity. Short-period oscillations connected with bremsstrahlung from energetic electrons incident in the upper atmosphere are described. The mean regularity of excitation of the small-period oscillations is compared with regularities in the occurence of luminous atmospherics. It is found that (in the case of similar diurnal, annual and cyclic variations) small-period oscillations and F-scattering appeared simultaneously in only 40-50% of the cases at the middle latitudes.
AD-657 164 HC$3.00 MF$0.65

DOPPLER PROFILES OF THE 5577 A AIRGLOW,
Queen's Univ Belfast (Northern Ireland) Dept of Applied Mathematics
P. B. Hays, and J. C. G. Walker. 15 Jul 66, 8p
AFCRL-67-0443
Contract AF 61 (052)-780
Availability: Published in Planet Space Sci v14 p1331-7 1966.

Descriptors: (*Airglow, Upper atmosphere), (*Oxygen, Recombination reactions), Ionosphere, Atmospheric sounding, Twilight, Atmosphere models, Doppler effect, Line spectrum.

We discuss the altitude and intensity of the nocturnal green line emission resulting from 02+ recombination. The Doppler profile of this emission is markedly non-thermal, the width being characteristic of the energy at which the 0 (1S) atoms are produced. A simple theory is formulated which predicts the profile of this line. Experimental evidence on airglow line profiles is reviewed and it is found that the effect predicted here has not yet been observed. However, a deliberate search for this effect should yield immediate results. (Author)
AD-657 266 Not available from CFSTI.

ON DIFFUSION THEORY IN A GRAVITATIONAL FIELD,
Space Sciences Inc Waltham Mass
Sigi Ziering, and Marshall Sheinblatt. 1967, 22p
AFOSR-67-1930
Contract AF 49 (638)-1666
Availability: Published in Rarefied Gas Dynamics, 5th Symposium v1 p325-44 1967.

Descriptors: (*Diffusion, *Gases), (*Gases, *Upper atmosphere), Gravity, Theory, Equations, Dynamics.

The effect on diffusion phenomena of increasing mean-free path with altitude in the upper regions of the atmosphere is considered. It is postulated for intermediate and large mean-free paths (say with respect to the scale height), that the gravitational field will have a significant influence on the particle motion within a few mean-free paths. The relative effect of collision mechanisms versus gravitational field is then of concern. It is evident that the standard barometric formula for the density and for the pressure will not suffice. These equations are solved to three levels of approximation, the highest level furnishing an improvement over the Chapman-Enskog solution for gravitational diffusion. (Author)
AD-657 271 Not available from CFSTI.

PROGRAM SOLUTIONS TO SPACE SCIENCE PROBLEMS,
International Business Machines Corp Cambridge Mass Cambridge Advanced Space Systems Dept
For primary bibliographic entry see Field 9B.
AD-657 333 HC$3.00 MF$0.65

MEASUREMENTS OF THE CHEMICAL CONSTITUTION OF THE ATMOSPHERE AT THE BLUE GLACIER FIELD STATION, MT OLYMPUS, WASHINGTON SUMMER, 1966,
Washington Univ Seattle Dept of Atmospheric Sciences
J. J. Kelley, Jr., and S. M. Hodge. Jul 67, 52p
Rept no. Scientific-11
Contract Nonr-477 (24)

Descriptors: (*Atmosphere, Chemical analysis), Carbon dioxide, Oxidizers, Water vapor, Diurnal variations, Washington (State), Transport properties, Particles, Gamma rays.

The results of the measurements on Mt. Olympus, Washington, of carbon dioxide, oxidant, water vapor, particulate matter, and total gamma-ray emitters in the atmosphere are presented, and analytical methods are described. Average daily concentrations are tabulated. Diurnal variations are given for total oxidant, water vapor, and carbon dioxide. (Author)
AD-657 446 HC$3.00 MF$0.65

COSMIC RAYS AS A HIGH-ENERGY PARTICLE SOURCE.
Revised ed.,
California Inst of Tech Pasadena
E. W. Cowan, and M. K. Moe. 27 Feb 67, 5p
Contract Nonr-220 (53)
Revision of manuscript submitted 22 Aug 66.
Availability: Published in The Review of Scientific Instruments v38 n7 p874-8 Jul 1967.

Descriptors: (*Cosmic rays, *Particle beams), Collimators, Energy, Absorption, Cloud chambers, Density, Photographs, Spectrometers, Protons, Ionization chambers, Pions, Momentum, Particles, Accuracy, Measurement, Electrons.

A large cloud-chamber-ion-chamber stack has been designed and operated to measure the properties of the interactions in light materials of cosmic-ray protons and pions in the energy range greater than 140 GeV. The usable flux of these particles at sea level is limited to the measured value of (1.3 plus or minus 0.1) x 0.0001 m/ster/sec by the requirement that each particle be unaccompanied by time-coincident particles in the aperture of the apparatus of 0.22 m/ster. With the use of this flux and the apparatus described, an interaction cross section for protons in carbon can be measured for energies up to 300 GeV in about a year. In the use of the ionization spectrometer, large fluctuations in the absorption curve have been observed that preclude the use of the shape of the curve alone to measure the energy of individual events. (Author)
AD-657 480 Not available from CFSTI.

COMPARAISON DES RESULTATS DE LA MESURE DU CONTENU TOTAL D'ELECTRONS OBTENUS PAR LA METHODE DU FARADAY DIFFERENTIEL ET PAR LA METHODE DES COINCIDENCES (Comparison of Results of Measurement of Total Electron Content Obtained by Using the Faraday Differential Method and the Coincidence Method),
Advisory Group for Aerospace Research and Development Paris (France)
F. Bertin, and J. Papet-Lepine. 1966, 15p Rept no. AGARD-552
Text in French. NATO furnished.

Descriptors: (*Electron density, *Upper atmosphere), Scientific satellites, Electrooptics, Mathematical analysis, Measurement.

The calculation of total electron content by measurement of the Faraday differential effect requires the use of fairly small equipment for the recording of signals which are transmitted on two adjacent frequencies. Starting from the fundamental equation, it is easy to derive two methods of calculation, one using the coincidence between two Faraday zeroes produced on each frequency transmitted, the other based upon the angular deviation between the Faraday effect on these two frequencies. The programming of all the digital calculations is described, and some results obtained by these two methods of calculations are compared. The mean difference does not exceed 5%. (Author)

AD-657 488 HC$3.00 MF$0.65

IONOSPHERIC RESEARCHES (ARTICLES 14).
Academy of Sciences (USSR), Moscow.
1965, 190p
in Russian, English Summaries

Descriptors: *Geomagnetic field, *Ionosphere, *Solar activity, Aurora, Circulation, Density, E layer, Electron, Field, Flare, Geomagnetic, Igy, Irregularity, Lower, Propagation, Storm, U.S.S.R..

For abstract, see STAR 05 19.
N67-32817 HC$3.00 MF$0.65

MAPPING OF THE EARTH'S BOW SHOCK AND MAGNETIC TAIL OF EXPLORER 33.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
K. W. Behannon. Jul 67, 76p NASA-TM-X-55868, X-612-67-344

Descriptors: *Bow shock, *Explorer xxxiii satellite, *Geomagnetism, *Interplanetary magnetic field, *Mapping, Bow, Cross section, Distance, Downstream, Field, Flux, Gate, Interplanetary, Lunar, Magnetic, Magnitude, Sensor, Sheath, Shock, Tail, Triaxis.

For abstract, see STAR 05 19.
N67-32848 HC$3.00 MF$0.65

THE JOINT SATELLITE STUDIES GROUP.
Paris Univ. (France).
Oct 66, 157p JSSG-2, AFCRL-66-859
Contract AF-EOAR-66-54

Descriptors: *Geophysics, *Ionospheric propagation, *Satellite observation, Activity, Astronomy, Atmospheric, Content, Density, Development, Doppler effect, Early bird satellite, Eclipse, Effect, Electron, Engineering, Equipment, Faraday effect, Faraday rotation, Group, Ionospheric, Joint, Magnetooptic, Measurement, Observation, Propagation, Radio, San marco satellite, Satellite, Scintillation, Signal, Solar, Sounding, Study, Transmission.

For abstract, see STAR 05 19.
N67-32982 HC$3.00 MF$0.65

PLASMAPAUSE AND DIFFUSION ACROSS FIELD LINES.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 20I.
For abstract, see STAR 05 19.
N67-33010 HC$3.00 MF$0.65

DIURNAL AND SEASONAL-LATITUDINAL VARIATIONS IN THE UPPER ATMOSPHERE.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
L. G. Jacchia, and J. W. Slowey. 6 Jun 67, 42p NASA-CR-87278, SAO SPECIAL REPT.-242
Grant NSG-87-60

Descriptors: *Diurnal variation, *Latitude, *Seasonal variation, *Upper atmosphere, Activity, Amplitude, Atmosphere, Bulge, Density, Diurnal, Drag, Elimination, Explorer xix satellite, Explorer xxiv satellite, Geomagnetic, Migration, Phase, Residual, Satellite, Season, Solar, Upper, Variation.

For abstract, see STAR 05 19.
N67-33263 HC$3.00 MF$0.65

AIR PRESSURE DEPENDENCE OF COSMIC RAY INTENSITY. METHODS AND RESULTS OF A STATISTICAL ANALYSIS ON NEUTRON MONITOR DATA.
Uppsala Univ. (Sweden). Inst. of Physics.
S. Martinelle. Nov 66, 30p SN-2, AFCRL-67-0212
Contract AF 61/052/-868

Descriptors: *Atmospheric pressure, *Cosmic ray, *Neutron counter, *Statistical analysis, Air, Analysis, Atmospheric, Charge, Cosmic, Counter, Data, Dependence, Intensity, Model, Monitor, Neutron, Particle, Pressure, Ray, Statistical, Theory.

For abstract, see STAR 05 19.
N67-33291 HC$3.00 MF$0.65

A NEW METHOD OF COMPARING THE PERFORMANCE OF NEUTRON MONITORS.
Uppsala Univ. (Sweden). Inst. of Physics.
S. Martinelle. Nov 66, 19p SN-2, AFCRL-67-0213
Contract AF 61/052/-868

Descriptors: *Cosmic radiation, *Neutron counter, *Radiation meter, Analysis, Comparison, Cosmic, Counter, Factor, Meter, Model, Monitor, Neutron, One, Performance, Radiation, Station, Theory.

For abstract, see STAR 05 19.
N67-33353 HC$3.00 MF$0.65

SOLAR WIND AND TEMPERATURE FIELD OF THE TROPOSPHERE.
Solnechnyy Veter I Temperaturnoye Pole Troposfery
Volt Technical Corp., Washington, D. C.
R. V. Smirnov. 10 Aug 67, 7p NASA-CR-87185, ST-STR-AM-10635
Contract NAS5-12487
Transl. Into English From Dokl. Akad. Nauk Sssr, Geofizika (Moscow), V. 175, No. 1, 1967 P 76-79

Descriptors: *Satellite measurement, *Solar wind, *Temperature field, *Troposphere, Explorer satellite, Field, Flux, Inversion, Lower, Mariner space probe, Measurement, Pioneer space probe, Plasma, Probe, Relation, Rocket, Satellite, Solar, Space, Temperature, U.S.S.R., Velocity, Wind.

For abstract, see STAR 05 19.
N67-33358 HC$3.00 MF$0.65

CIRCULATION FEATURES OF THE STRATOSPHERE DERIVED FROM RADIOMETRIC TEMPERATURE MEASUREMENTS WITH THE TIROS VII SATELLITE.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. S. Kennedy, and W. Nordberg. Mar 67, 38p NASA-TM-X-55859, X-620-67-134

Descriptors: *Atmospheric circulation, *Carbon dioxide, *Satellite measurement, *Stratosphere radiation, *Temperature profile, *Tiros vii satellite, Atmospheric, Black, Body, Carbon, Circulation, Dioxide, Eddy, Field, Fourier analysis, Globe, Heat, Hemisphere, High, Horizontal, Latitude, Lower, Measurement, Meteorology, Ozone, Profile, Radiation, Radiometry, Satellite, South, Stratosphere, Synoptic, Temperature, Tiros satellite, Transport, Variation, Winter, Zone.

For abstract, see STAR 05 19.
N67-33409 HC$3.00 MF$0.65

RELATIONSHIP BETWEEN CHANGES IN THE INTERPLANETARY MAGNETIC FIELD AND VARIATIONS IN THE MAGNETIC FIELD AT THE EARTH'S SURFACE.
Royal Inst. of Tech., Stockholm (Sweden). Div. of Plasma Physics.
For primary bibliographic entry see Field 8N.
For abstract, see STAR 05 19.
N67-33448 HC$3.00 MF$0.65

ON THE MAGNETOSPHERIC TEMPERATURE DISTRIBUTION.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
H. G. Mayr, and H. Volland. Jun 67, 18p NASA-TM-X-55871, X-621-67-291

Descriptors: *Heat flux, *Magnetospheric electron density, *Temperature distribution, Conduction, Density, Distribution, Electron, Equation, Flux, Imp, Magnetosphere, Parallel, Perpendicular, Plasma, Spectrum, Temperature, Turbulence.

For abstract, see STAR 05 19.
N67-33476 HC$3.00 MF$0.65

RESEARCH ON ATMOSPHERIC OPTICAL RADIATION TRANSMISSION FINAL REPORT, 1 DEC. 1965 - 30 NOV. 1966.
Johannes-gutenberg-universitat, Mainz (West Germany). Meteorologisch-geophysikalisches Inst.
W. Blaettner, K. Bullrich, E. De Bary, R. Eiden, and G. Haenel. Jan 67, 127p AFCRL-67-0207, AD-653757
Contract AF 61/052/-595

Descriptors: *Light transmission, *Radiation measurement, *Sky radiation, *Spectral analysis, Absorption, Aerosol, Albedo, Analysis, Atmospheric, Brightness, Data, Light, Measurement, Optical, Polarization, Radiation, Reflection, Scattering, Sky, Spectral, Transmission, Weather, Wind.

For abstract, see STAR 05 19.
N67-33500 HC$3.00 MF$0.65

ON THE COLLECTION OF COSMIC DUST SAMPLES FOR CRYSTALLOGRAPHIC STUDY.
Stockholm Univ. (Sweden). Inst. of Meteorology.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 19.
N67-33521 HC$3.00 MF$0.65

SUGGESTIONS FOR MAGNETOSPHERIC EXPERIMENTS.
Imperial Coll. of Science and Technology, London (England).
J. J. Quenby. May 66, 14p ESRO-SN-29
Presented At the Esro Colloq. on Auroral and Assoc. Magnetospheric Phenomena At Very High Latitudes, Stockholm, 16-18 Nov. 1965

Descriptors: *Magnetosphere, *Satellite orbit, *Trapped particle, *Wave interaction, Boundary, Conference, Diffusion, Experiment, Inclination, Interaction, Orbit, Particle, Satellite, Trapping, Wave.

For abstract, see STAR 05 19.
N67-33522 HC$3.00 MF$0.65

MAGNETIC STORM EFFECTS ASSOCIATED WITH THE TAIL OF MAGNETOSPHERE.
Cornell Univ., Ithaca, N. Y.
For primary bibliographic entry see Field 8N.
For abstract, see STAR 05 19.
N67-33532 HC$3.00 MF$0.65

NEW PARTICLE MEASUREMENTS BY A SATELLITE IN A HIGHLY-ECCENTRIC POLAR ORBIT.
Rice Univ., Houston, Tex.
B. J. Obrien. May 66, 25p ESRO-SN-30
Presented At the Esro Colloq. on Auroral and Assoc. Magnetospheric Phenomena At Very High Latitudes, Stockholm, 16-18 Nov. 1965

Descriptors: *Esro ii satellite, *Magnetosphere, *Particle, *Polar orbit, *Van allen belt, Aurora, Eccentricity, Measurement, Neutral, Orbit, Point, Polar, Satellite, Solar, Wind.

For abstract, see STAR 05 19.
N67-33533 HC$3.00 MF$0.65

DESIRABLE MAGNETIC FIELD MEASUREMENTS IN THE HIGH-LATITUDE MAGNETOSPHERE.
Royal Inst. of Tech., Stockholm (Sweden).
For primary bibliographic entry see Field 8N.
For abstract, see STAR 05 19.
N67-33536 HC$3.00 MF$0.65

RESEARCH IN ELECTRON PHYSICS AND PLASMA PHYSICS AT THE ROYAL INSTITUTE OF TECHNOLOGY, STOCKHOLM, SWEDEN.
Royal Inst. of Tech., Stockholm (Sweden).
For primary bibliographic entry see Field 20I.
For abstract, see STAR 05 19.
N67-33636 HC$3.00 MF$0.65

COMPARATIVE STUDY OF VARIOUS SOUNDING ROCKETS.
European Space Technology Center, Noordwijk (Netherlands).
For primary bibliographic entry see Field 16D.
For abstract, see STAR 05 19.
N67-33637 HC$3.00 MF$0.65

SOUNDING ROCKET TRAJECTORY DETERMINATION FROM SINGLE STAGE RANGE MEASUREMENTS ONLY.
Tuab Teleutredningar A.B., Solna (Sweden). Space Technology Group.
For primary bibliographic entry see Field 16B.
For abstract, see STAR 05 19.
N67-33642 HC$3.00 MF$0.65

IONOSPHERIC RESEARCHES USING SATELLITES PROGRESS REPORT, 1 JAN. 1965 - 31 MAR. 1967.
Paris Univ. (France).
E. J. Vassy. 15 Apr 67, 49p PR-13, AFCRL-67-0337
Contract AF 61/052/-761

Descriptors: *Atmospheric refraction, *Faraday effect, *Ionospheric absorption, *Ionospheric electron density, Absorption, Atmospheric, Content, Density, Electron, Ionospheric, Radio, Record, Refraction, Satellite, Signal, Sounding.

For abstract, see STAR 05 19.
N67-33660 HC$3.00 MF$0.65

PRELIMINARY RESULTS OF ELECTRIC FIELD MEASUREMENTS IN THE AURORAL ZONE.
Max-planck-institut Fur Physik Und Astrophysik, Munich (West Germany).
H. Foeppl, G. Haerendel, L. Haser, R. Luest, and F. Melzner. 20 Jul 67, 15p

Descriptors: *Auroral zone, *Electric field, *Electron density, *Nike-Apache rocket, Artificial, Aurora, Barium, Cloud, Conductivity, Density, Electric, Electron, Field, Ion, Ionospheric, Rocket, Zone.

For abstract, see STAR 05 19.
N67-33851 HC$3.00 MF$0.65

A MODEL EQUATORIAL ELECTROJET.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. C. Cain, and M. Sugiura. Nov 65, 24p NASA-TM-X-55404, X-612-65-482

Descriptors: *Equatorial electrojet, *Longitude, Coefficient, Cross section, Determination, Dip, Drift, Electrojet, Electron, Equator, Field, Gauss function, Geomagnetic, Magnetic, Profile, Variation, Velocity.

For abstract, see STAR 05 19.
N67-33895 HC$3.00 MF$0.65

PAYLOAD MISSIONS AND CONSTRUCTION OF THE THIRD RUBIS ROCKET.
Aufgaben Und Aufbau Der Nutzlast Der Dritten Rubis-forschungsrakete
Max-planck-institut Fur Physik Und Astrophysik, Munich (West Germany).
F. Melzner. Sep 66, 9p MPI-PAE/EXTRA-TERR.-35/66
in German Presented At the Ann. Joint Meeting grt/Wglr, Bad Godesberg, W. Germany, Oct. 1966 Its Paper 66-068

Descriptors: *Electric field, *Geomagnetic field, *Payload, *Rubis rocket, Artificial, Barium, Cloud, Conference, Electric, Experiment, Field, Geomagnetic, Ion, Magnetic, Rocket, Terrestrial.

For abstract, see STAR 05 19.
N67-33942 HC$3.00 MF$0.65

MEASUREMENT OF ELECTRIC FIELDS IN THE IONOSPHERE AND MAGNETOSPHERE.
University Coll., London (England).
R. L. Boyd. May 66, 19p ESRO-SN-27
Presented At the Esro Colloq. on Auroral and Assoc. Magnetospheric Phenomena At Very High Latitudes, Stockholm, 16-18 Nov. 1965

Descriptors: *Atmospheric ionization, *Electric field, *Magnetosphere, Atmospheric, Electric, Emission, Field, Intensity, Ionization, Measurement, Method, Plasma, Potential, Probe, Spacecraft.

For abstract, see STAR 05 19.
N67-33946 HC$3.00 MF$0.65

4B. Meteorology

STUDIES ON THE METEOROLOGY OF ALASKA.
Interim rept. no. 2, 1 Jan-31 Dec 66,
Environmental Science Services Administration Silver Spring Md Environmental Data Services
Nina A. Stepanova. May 67, 58p

Descriptors: (*Alaska, Meteorology), (*Atmospheric temperature, Anomalies), Upper atmosphere, Meteorological charts, Air mass analysis, Cyclones, Anticyclones, Meteorological parameters, Climatology.

The circulation patterns and synoptic processes associated with periods of very low temperatures in Alaska were examined from the view point of Synoptic climatology. The study is based mostly on monthly and daily temperature data obtained from meteorological stations in Alaska during the period 1948 - 1964 /5/, /6/, and upon analysis of the synoptic charts presented by the Polar Weather Maps publication, U. S. Weather Bureau /4/. Individual months, with extremely low mean monthly temperatures were selected for detailed analysis from series of observations within the above mentioned period. These months were: December 1957, January 1960, and February 1950. (Author)
AD-656 931 HC$3.00 MF$0.65

THE FORCES ON TWO SPHERES IN STOKES FLOW,
Rand Corp Santa Monica Calif
M. H. Davis. Aug 67, 24p Rept no. RM-5357-PR
Contract F44620-67-C-0045

Descriptors: (*Spheres, Fluid dynamic properties), (*Clouds, Hydrodynamics), Drops, Force (Mechanics), Torque, Mathematical analysis.

An analysis was made of the hydrodynamic forces on cloud droplets with radii less than 30 microns near each other in a viscous fluid. Previous work solved the problem for velocities parallel to the line of centers of the droplets; the study considers the far more complex case of motion perpendicular to that line. The Stokes linearized hydrodynamic theory is used, extending Hocking's analysis of nonrotating spheres to spheres that are assumed to rotate freely enough to nullify the torques that would be produced by fluid shear. Velocity expressions were constructed in terms of spherical harmonics centered on each of the spheres. The linear system of an infinite number of algebraic equations in an infinite number of unknowns was truncated to finite size. The forces and torques were evaluated, and the forces were superposed, according to the Stokes procedure, to obtain the force under a condition of rotation such that the torque on each sphere was zero. Reasonably reliable force calculations are feasible at separations down to 0.1 of the radius of the larger droplet; beyond that, the results are numerically unstable. Above 0.5 separation, results are the same as Hocking's approximations. (Author)
AD-657 008 HC$3.00 MF$0.65

THE TROPICAL UPPER TROPOSPHERIC TROUGH AS A SECONDARY SOURCE OF TYPHOONS AND A PRIMARY SOURCE OF TRADEWIND DISTURBANCES.
Final rept. 1 Feb 64-31 Jan 67,
Hawaii Inst of Geophysics Honolulu
James C. Sadler. 3 Jul 67, 53p Rept no. HIG-67-12
AFCRL-67-0203
Contract AF 49 (628)-3860

Descriptors: (*Tropical cyclones, Sources), (*Troposphere, Climatology), Tracking, Meteorological charts, Pacific Ocean, Atlantic Ocean, Pacific Ocean islands, Meteorological satellites, Cloud cover, Atmospheric temperature.
Identifiers: Tradewinds.

Surface and 250 mb analyses for a 9-day summer period over the North Pacific, together with satellite photographs, are shown to illustrate (1) the development of a typhoon and a tropical storm from cyclonic cells in the tropical upper tropospheric trough, and (2) the dominance of the trough in producing tradewind weather. (Author)
AD-657 021 HC$3.00 MF$0.65

APPLICATION OF NUMERICAL WEATHER PREDICTION TECHNIQUES IN THE OPERATIONAL ROUTINE OF THE HYDROMETEOROLOGICAL SERVICE OF THE USSR.
Directorate of Scientific Information Services Ottawa (Ontario)
V. A. Bugaev, and S. L. Belousov. 1966, 13p
TT-66-34835
Trans. of Meteorologia i Gidrologia (USSR) n8

p3-11 1966.
Availability: Published in Atmosphere v5 n1 p20-32.

Descriptors: (*Weather forecasting, Mathematical prediction), (*Atmosphere models, Weather forecasting), Air mass analysis, Atmospheric temperature, Northern hemisphere, Barometric pressure, USSR, Heat transfer.

The paper reviews the application of numerical weather prediction techniques in the daily operational routine of the Hydrometeorological Service of the USSR. The theoretical aspects of numerical weather prediction models used have been discussed by the authors in original papers and are not repeated here.
AD-657 071 Not available from CFSTI.

A STUDY OF PERSISTENT AND WIDESPREAD FOG PERIODS IN SOUTHERN GERMANY,
Weather Wing (2nd) New York 09332
Willi Laun. 15 Aug 67, 25p

Descriptors: (*Fog, *West Germany), Anticyclones, Air mass analysis, Meteorological charts, Cyclones, Cloud cover, Meteorological phenomena.

The study discusses 10 cases of widespread heavy fog occurring over the southern half of Germany during the October to March periods of the years 1958 to 1961. The general surface and 500 mb synoptic situations attending fog formations are discussed and charts are included. (Author)
AD-657 088 HC$3.00 MF$0.65

THE PROBABILITY OF OCCURRENCE OF RADAR ECHOES OVER AREAS OF ARBITRARY SIZE,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 17I.
AD-657 153 HC$3.00 MF$0.65

FUNCTIONS OF PROCESSES WITH MARKOVIAN STATES.
Michigan State Univ East Lansing Dept of Statistics
For primary bibliographic entry see Field 12A.
AD-657 176 HC$3.00 MF$0.65

URBAN CLIMATOLOGICAL STUDIES.
Interim rept. no. 1,
Stanford Research Inst Menlo Park Calif
F. L. Ludwig. Feb 67, 98p
Contract OCD-PS-64-201

Descriptors: (*Urban areas, *Climatology), Temperature, Humidity, Instrumentation, Diurnal variations, Measurement, Louisiana, New Mexico, California.

The report describes portable automobile-mounted, recording, temperature measurement systems using ventilated radiation-shielded thermistor elements to measure wet and dry bulb temperatures at heights of 0.3 and 2 meters with an accuracy of about plus or minus 0.25C. The units were used on two vehicles to survey horizontal temperature fields in San Jose, Calif.; Albuquerque, N.M.; and New Orleans, La., during the summer of 1966. About three weeks were spent in each city, covering areas from the city's center to its edge. Chart records of temperature were transferred to punched cards and processed. They were interpolated to common hours and averaged for about 50 selected locations in each city. The averages are in a relative form, where each of the 18 to 20 thousand individual temperatures had subtracted from it that day's noon airport temperature. Relative wet-bulb temperature fields are also presented. Daytime results are stressed. Preliminary analyses indicate that the effect of built-up areas, as distinct from other influences, is to raise the temperature by about 1/2C during the day. Shaded or grassy spaces are about 1/2C cooler than their unshaded surroundings. (Author)
AD-657 248 HC$3.00 MF$0.65

CLIMATIC NORMALS AS PREDICTORS. PART I. BACKGROUND,
San Fernando Valley State Coll Northridge Calif
Arnold Court. 1 May 67, 40p Rept no. Scientific-1, 82-67-1
AFCRL-67-0313
Contract AF 19 (628)-5716

Descriptors: (*Climatology, Predictions), Monte Carlo method, Time, Instrumentation, Periodic variations, Temperature, Diurnal variations, Sampling, Diagrams.

Preliminary to investigating the length of the climatic period whose average gives the best (minimum variance) estimate of the next year's value, previous studies are examined and the results of five are replotted onto a standard scale. All indicate that prediction one year ahead from an average based on only 20 years, or so, is better than one from a standard 'climatic normal' of 30 years. Monte Carlo simulation of the prediction process suggests that slight changes with time in the means, whether real or caused by instrumental or observational changes, in most climatic records reduce the record length for optimum prediction. (Author)
AD-657 358 HC$3.00 MF$0.65

MONTE CARLO CALCULATIONS OF LIGHT SCATTERING FROM CLOUDS,
Southwest Center for Advanced Studies Dallas Tex
Gilbert N. Plass, and George W. Kattawar. 23 May 67, 47p Rept no. Scientific-2
AFCRL-67-0421
Contract AF 19 (628)-5039

Descriptors: (*Clouds, Optical properties), (*Monte Carlo method, Atmosphere models), Light transmission, Photons, Reflectivity, Aerosols, Scattering, Albedo, Water vapor, Mathematical analysis.

The scattering of visible light by clouds is calculated from an efficient Monte Carlo code which follows the multiply scattered path of the photon. The single scattering phase function is obtained from the Mie theory by integration over a particle size distribution. The photons are followed through a sufficient number of collisions and reflections from the lower surface (which may have any desired albedo) until they make a negligible contribution to the intensity. Various variance reduction techniques were used to improve the statistics. The reflected and transmitted intensity is studied as a function of solar zenith angle, optical thickness, and surface albedo. The downward flux, cloud albedo, and mean optical path of the transmitted and reflected photons are given as a function of these same parameters. The numerous small angle scatterings of the photon in the direction of the incident beam are followed accurately and produce a greater penetration into the cloud than is obtained with a more isotropic and less realistic phase function. (Author)
AD-657 363 HC$3.00 MF$0.65

AN OBJECTIVE TECHNIQUE FOR FORECASTING SUMMER THUNDERSTORMS AT DAVIS-MONTHAN AIR FORCE BASE, ARIZONA,
Weather Wing (9th) Davis-Monthan AFB Ariz Detachment 2
Robert E. Clark, and Keith R. Cooley. 1 Aug 66, 21p

Descriptors: (*Weather forecasting, *Thunderstorms), Graphics, Meteorological parameters, Arizona.

An objective forecasting technique, using data obtained from the Tucson 1200Z RAOB, was developed for Davis-Monthan AFB. Plots of various combinations of the indices of moisture, instability, and movement indicate (by a simple summing process) likelihood of thunderstorm activity and probable time of occurrence, if activity is likely. The technique developed is based on two years of data, the summers of 1964 and 1965, and verified against data for the summer of 1966. Although the sample is small, results appear to be very good considering the rigid verification criteria established and the other normal variability factors. (Author)
AD-657 383 HC$3.00 MF$0.65

WIND TUNNEL TESTS OF SIMULATED SPHERICAL HAILSTONES WITH VARIABLE ROUGHNESS,
Massachusetts Inst of Tech Cambridge
Ronald G. Eng Young, and Keith A. Browning. 18 Jan 66, 7p
AFOSR-67-1910
Grant AF-AFOSR-156-64
Availability: Published in Journal of the Atmospheric Sciences v24 n1 p58-62 Jan 1967.

Descriptors: (*Hail, Simulation), Wind tunnel models, Surface roughness, Tests, Drag, Reynolds number, Spheres, Aerodynamic characteristics.

Wind tunnel test data on the relationship between drag coefficient and Reynolds number are presented for solid spherical models with different roughness parameters. Using a wind tunnel with minimal free-stream turbulence it is found that spheres with spherical roughness elements designed to simulate hailstones with rough rime coats exhibit an unexpectedly sharp drop in drag coefficient at critical Reynolds number. For a spherical hailstone with roughness elements as large as 0.02 inch, the transition to the lower drag coefficient could occur when the stone is as small as 1.6 inch in diameter (for a smooth sphere the corresponding transition does not occur unless its diameter exceeds 4 inches). (Author)
AD-657 408 Not available from CFSTI.

VIBROTRON ANALOG MICROBAROGRAPH SYSTEM.
Revised ed.,
Navy Electronics Lab San Diego Calif Radio Physics Div
F. E. Morris. 12 Dec 66, 3p
Revision of manuscript received 21 Oct 66.
Availability: Published in Review of Scientific Instruments v38 n4 p514-6 Apr 1967.

Descriptors: (*Barometric pressure, *Recording systems), Analog systems, Electronic recording systems, Sensors, Barometers, Pressure, Transducers, Digital-to-analog converters, Amplifiers, Integrators.

An analog microbarograph system for recording atmospheric pressure is described. Pressure sensitivity ranges and time response are selectable from simple front panel controls making the system extremely observable for experimental work. Slight modifications would make the system adaptable to pressure ranges other than the atmospheric range. (Author)
AD-657 514 Not available from CFSTI.

REMARKS ON CLOUD MAPPING BY THE METEOROLOGICAL SATELLITES NIMBUS I AND NIMBUS II.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
G. Kuers. Jul 67, 37p NASA-TM-X-55873, X-662-67-337

Descriptors: *Cumulus cloud, *Mapping, *Nimbus satellite, *Radiometer, Albedo, Cloud, Cumu-

lus, Day, Filter, Fog, High resolution, Infrared, Interference, Meteorology, Night, Reflection.

For abstract, see STAR 05 19.
N67-33968 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

A COMPUTERIZED INVENTORY CONTROL SYSTEM,
Naval Ordnance Lab White Oak Md
C. Nicholas Pryor. 17 Jul 67, 52p Rept no. NOLTR-67-92

Descriptors: (*Inventory control, Computer programs), (*Management planning, Inventory control), Punched cards, Flow charting, Subroutines, Predictions, Scheduling.
Identifiers: On-line systems.

An inventory control program has been devised for the IBM 7090 computer to meet the requirements of a small electronic system development group. The system presently uses punch card input for control information, but is adaptable to on-line operation in multiple access systems. The inventory system keeps a record of the present stock of a number of items, and records all orders and reservations for the items. On the basis of these orders and reservations, the system predicts future quantities of the items and warns when an item reaches a critical level. This system should be generally useful to activities requiring a continuing stock of a moderate number of distinct items. (Author)
AD-656 900 HC$3.00 MF$0.65

MATHEMATICAL PROGRAMMING.
Northwestern Univ Evanston Ill Technological Inst
For primary bibliographic entry see Field 12B.
AD-656 904 HC$3.00 MF$0.65

GENERATION AND APPROXIMATION OF REACH AND DISTRIBUTION OF FREQUENCIES.
Northwestern Univ Evanston Ill Technological Inst
For primary bibliographic entry see Field 12B.
AD-656 905 HC$3.00 MF$0.65

THE CURRENT STATE OF CHANCE-CONSTRAINED PROGRAMMING.
Northwestern Univ Evanston Ill Technological Inst
For primary bibliographic entry see Field 12B.
AD-656 907 HC$3.00 MF$0.65

BUDGE ALLOCATION FOR SHELTER SYSTEMS.
Final rept.,
Research Triangle Inst Durham N C Operations Research and Economics Div
Philip S. McMullan, James C. Wright, Helen S. Anderson, and Stanley Trustman. Jun 67, 107p Rept no. RTI-OU-230-1
Contract OCD-PS-64-56

Descriptors: (*Fallout shelters, *Budgets), (*Civil defense systems, Budgets), Optimization, Probability, Cost effectiveness, Management planning.

A computer model which prepares optimum civil defense shelter postures built upon the base of the current National Fallout Shelter Survey is developed, programmed, and demonstrated. 'Optimum' can be based on the user-specified objective of either minimum fatalities or minimum casualties. The user determines the level of risk by supplying an attack environment (both blast and fallout) which is used to calculate the probability of fatality (or casualty) for a person in each existing shelter and in each proposed shelter option in each standard location. Population is then assigned to existing and proposed shelter in an optimum manner, subject to the specified budget. The mathematical formulation is equivalent to a linear program. The model also permits an evaluation of shelter improvement programs against any user supplied attack environment. At the option of the user, the following inputs may be varied: (a) budget level, (b) degree of risk or hazard, (c) definition of shelter fallout or blast vulnerability, and (d) cost per space of shelter. The model was demonstrated using the state of Rhode Island. The model can be used primarily in synthesis and analysis of 'near future' shelter systems and can be modified for use in more comprehensive system studies (e.g., combined warning, movement, and shelter system studies) and cost-effectiveness evaluations. (Author)
AD-656 940 HC$3.00 MF$0.65

COMPUTER AIDS FOR AEROSPACE DESIGN AND ENGINEERING: INNOVATION, ECONOMICS AND PUBLIC POLICY,
Rand Corp Santa Monica Calif
Curtis P. McLaughlin. Jul 67, 59p Rept no. RM-5624-PR
Contract F44620-67-C-0045

Descriptors: (*Weapon systems, *Data processing systems), (*Systems engineering, Aircraft industry), Costs, United States Government, Design, Creativity, Economics, Computers, Management planning, Effectiveness, Standardization.

A discussion of the applications of computer systems to the weapons systems development process, with emphasis on the role that the government might play in promoting, supporting, and implementing development of new computer-based systems for engineering support in the aerospace industry. Potential payoffs to the government lie in reduction of design costs, improvement of design and product performance, enhancement of engineering and creativity and productivity, and reduction of lead time for design, prototype production, and final production. A number of alternatives are open to the government in increasing the rate of development and diffusion of computer technology in industry. To determine the level and nature of such support, it is recommended that a study be made of the specific economic benefits that would result. (Author)
AD-657 009 HC$3.00 MF$0.65

A SUPPLEMENTARY GUIDE FOR CONCEPT FORMULATION STUDIES,
Stanford Univ Calif Graduate School of Business
John D. S. Gibson. Dec 66, 79p

Descriptors: (*Management planning, Decision making), Department of Defense, Budgets, Scheduling, Cost effectiveness, Optimization, Scientific research, Military engineering, Costs, Economics.
Identifiers: Concept formulation studies.

This report provides guidance for Concept Formulation Studies supplementary to that contained in official Department of Defense and Service Documents. It is primarily concerned with management problems and procedures associated with studies involving large amounts of information and participation by different technical specialists, and which must derive clear resource allocation decision guidance. This report was based on both the author's experience as a Concept Formulation study manager and his retrospective analysis of the problems and responsibilities of a Concept Formulation study manager. (Author)
AD-657 033 HC$3.00 MF$0.65

A DEMAND PREDICTION TECHNIQUE FOR ITEMS IN MILITARY INVENTORY SYSTEMS,
George Washington Univ Washington D C Logistics Research Project
For primary bibliographic entry see Field 15E.
AD-657 180 HC$3.00 MF$0.65

PROGRAM TO ENHANCE THE TRANSFER OF NEW TECHNOLOGY TO POTENTIAL INDUSTRIAL, GOVERNMENTAL, NEW TECHNOLOGY TO POTENTIAL INDUSTRIAL, GOVERNMENTAL AND ACADEMIC USERS IN THE OKLAHOMA AREAS QUARTERLY STATUS REPORT, 1 APR. - 30 JUN. 1967.
Southeastern State Coll., Durant, Okla. Technology Use Studies Center.
L. B. Zink. Jul 67, 20p NASA-CR-87305, QSR-9
Contract NSR-37-004-006

Descriptors: *Industry, *Technology, Brazing, Government, Joining, Oil, Plastics, Steel, Utilization, Welding.

For abstract, see STAR 05 19.
N67-32974 HC$3.00 MF$0.65

SPECULATIVE ANALYSIS OF THE COST RELATIONSHIP BETWEEN DESALINATION SYSTEM SIZE AND THE MARKET GROWTH RATE,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 7A.
For abstract, see NSA 21 16.
ORNL-TM-1399 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. the collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

5B. Documentation and Information Technology

RESEARCH ON INTELLIGENT QUESTION-ANSWERING SYSTEM,
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 9B.
AD-656 789 HC$3.00 MF$0.65

DATA AUTOMATION DEVELOPMENT AND SYSTEMS IMPLEMENTATION -- SOME PROBLEMS AND CONCLUSIONS,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 9B.
AD-657 005 HC$3.00 MF$0.65

TECHNICAL MANUALS EVALUATION PROGRAM: SIMMS FORMAT VERSUS CONVENTIONAL ORDNANCE PAMPHLET,
Naval Underwater Weapons Research and Engineering Station Newport R I
N. E. Singleton, and E. I. Pederson. Aug 67, 26p
Rept no. NUWS Consecutive-443

Descriptors: (*Instruction manuals, Effectiveness), (*Electronic equipment, Maintenance), Electronic technicians, Malfunctions, Checkout equipment, Test equipment (Electronics).
Identifiers: Technical manuals, SIMMS.

SIMMS (Symbolic Integrated Maintenance Manuals) is a new concept for presenting the maintenance and troubleshooting information needed by Fleet technicians to keep their equipment operational. A technical manual evaluation program was conducted at NUWS to compare the troubleshooting capabilities of Fleet technicians using a conventionally prepared manual (OP) versus a manual prepared in the SIMMS format. A moderately complex piece of electronic equipment - the Missile Electrical System Test Set Mk 363, used to check the ASROC Weapon System - was selected for the evaluation, and sixteen Fleet technicians were temprarily assigned to NUWS for the test program. Although the overall results showed SIMMS to be about equal in effectiveness to the conventional manual; when the briefness of the orientation period and the technicians' lack of prior training with SIMMS are taken into account, the SIMMS format did show a significant advantage. During the final two-thirds of the evaluation, Class A technicians using SIMMS obtained almost as many correct solutions to the troubleshooting problems as the Class C technicians using the conventional manual. It also took them less time, on the average, with SIMMS. As the program progressed there was a steady increase in the percentage of correct solutions made by both Class A and Class C technicians using SIMMS. The same was not true with the conventional manual. Reaction of the Fleet technicians to SIMMS was generally favorable. (Author)
AD-657 175 HC$3.00 MF$0.65

TEACHING THE USE OF THE LIBRARY TO UNDERGRADUATES: AN EXPERIMENTAL COMPARISON OF COMPUTER-BASED INSTRUCTION AND THE CONVENTIONAL LECTURE METHOD,
Illinois Univ Urbana Coordinated Science Lab
For primary bibliographic entry see Field 5I.
AD-657 216 HC$3.00 MF$0.65

COMPUTER AND INFORMATION SCIENCES-II,
Battelle Memorial Inst Columbus Ohio Columbus Labs
For primary bibliographic entry see Field 9B.
AD-657 347 Not available from CFSTI.

LIST OF LIBRARY ACCESSIONS, FFC-3927 TO FFC-4061.
Federal Fire Council Washington D C
For primary bibliographic entry see Field 13L.
AD-657 390 HC$3.00 MF$0.65

COMPUTER-ASSISTED TEXT PREPARATION.
Technical rept.,
Maryland Univ College Park Computer Science Center
Joseph Hilsenrath, and Klaus Waibel. Jul 67, 40p
Rept no. TR-67-47
Contract Nonr-595 (23)

Descriptors: (*Textbooks, Preparation), Computer programs, Instruction manuals, Theses.

The booklet is designed to introduce the graduate student of any university department to a computer application which will assist him in the preparation of his dissertation. This booklet describes a text editing program, perhaps the most sophisticated one so far developed. With it he can produce a finished dissertation without hiring a typist. With this program and an ordinary IBM card punch, which the student can treat like a portable typewriter, he can start preparing copy for the dissertation as early as the problem will permit. He can modify the text as the problem progresses, and rely upon the computer to prepare a clean copy at any stage of the work. Heretofore, computer output provided text in all capital letters. Now a number of computer printers have extended character sets permitting upper and lower case letters, a variety of symbols, and even the superscripts and subscripts so necessary in mathematics and chemistry. The existence of the new print chains or trains has stimulated the development of a variety of editing programs. The more sophisticated of these is a program called 'TEXT90' developed by the International Business Machines Corporation for the preparation of their computer manuals. It is this program that is described here. (Author)
AD-657 457 HC$3.00 MF$0.65

THREE SPECIAL EXPERIMENTAL PROJECTS IN TECHNOLOGY UTILIZATION QUARTERLY PROGRESS REPORT, APR 1 - JUN. 30, 1967.
North Carolina Science and Technology Research Center, Raleigh.
P. J. Chenery, and E. W. Erickson. Jun 67, 11p
NASA-CR-87303, QPR-1
Contract NSR-34-007-005

Descriptors: *Nasa program, *Technology, Cost, Engineering, Industry, Information, Science, Utilization.

For abstract, see STAR 05 19.
N67-33018 HC$3.00 MF$0.65

INDEX OF PROCEEDINGS OF REMOTE SYSTEMS TECHNOLOGY DIVISION OF AMERICAN NUCLEAR SOCIETY, VOLUMES 1-14,
Sandia Corp., Albuquerque, N. Mex.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 16.
SC-R-67-1056 HC$3.00 MF$0.65

CORPORATE AUTHOR HEADINGS USED BY THE U. S. ATOMIC ENERGY COMMISSION IN CATALOGING REPORTS.
Revised ed. no. 7.
Division of Technical Information Extension (AEC), Oak Ridge Tenn.
May 67, 143p

Descriptors: (*Catalogs, Reports), (*Scientific research, *Documentation), Nuclear physics.

For abstract, see NSA 21 16.
TID-5059 HC$3.00 MF$0.65

5C. Economics

POLITICAL DEVELOPMENT AS A POLICY SCIENCE: A POLEMIC,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 5D.
AD-657 002 Not available from CFSTI.

REVIEW OF 'CHANGING PATTERNS OF ADMINISTRATION IN RURAL EAST PAKISTAN',
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 5D.
AD-657 007 HC$3.00 MF$0.65

COMPUTER AIDS FOR AEROSPACE DESIGN AND ENGINEERING: INNOVATION, ECONOMICS AND PUBLIC POLICY,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 5A.
AD-657 009 HC$3.00 MF$0.65

THE FEASIBILITY OF DEVELOPING TRANSFER OF TECHNOLOGY FUNCTIONS,
Howard Univ Washington D C
Daniel L. Spencer, and Alexander Woroniak.
1967, 32p
AFOSR-67-1873
Grant AF-AFOSR-533-67
Prepared in cooperation with Catholic Univ., Washington, D. C.
Availability: Published in International Review for Social Sciences v20 n2 p431-59 1967.

Descriptors: (*Economics, Japan), Social sciences, Industrial production, Labor, Industries, Government (Foreign), Statistical analysis, Predictions, Education.

Rather than to approach technology within the framework of production function as a type of residual factor input, this paper attempts to develop transfer of technology functions. Using data based on post-war experience of Japan, the issue is raised: how to facilitate the transfer of technology (absorption function). At the same time, an effort is made to identify and measure the relationship between the growth of output produced by the application of new borrowed technology and a group of significant explanatory variables (impact function). The absorption regression indicates that explanatory variables which facilitate a society's ability to absorb technology are mainly some combination of quantifiable measures of: (1) educational and technological niveau; (2) society's planned and predetermined effort to raise this niveau; (3) coordinated policies of government guidance in the induction of productive types of technology; (4) availability of channels for intake of information about foreign technology and markets for new goods abroad (i.e. antennae). Findings of the two impact functions indicate a strong correlation between the growth in foreign and domestic sales of goods produced with new borrowed technology and two major explanatory inputs. On the one side, a nation's own effort to elevate the technological level of production processes stands out prominently; on the other hand, the visible indicators of induced technology (e.g. import of technically advanced machinery and raw materials reflecting new productive processes) figure prominently as major contributory factors. (Author)
AD-657 040 Not available from CFSTI.

A HEURISTIC COMPROMISE BETWEEN PROBABILITY OF SUCCESS AND LIMITED RESOURCES.
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
For primary bibliographic entry see Field 12B.
AD-657 168 HC$3.00 MF$0.65

THE KERNAL AND BARGAINING SET FOR CONVEX GAMES,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 12B.
AD-657 332 HC$3.00 MF$0.65

DIRECT OPERATING COSTS AND OTHER PERFORMANCE CHARACTERISTICS OF TRANSPORT AIRCRAFT IN AIRLINE SERVICE: CALENDAR YEAR 1962.
Federal Aviation Agency Washington D C Office of Policy Development
For primary bibliographic entry see Field 1B.
AD-657 437 HC$3.00 MF$0.65

5D. History, Law, and Political Science

THE COMMUNIST INSURGENT INFRASTRUCTURE IN SOUTH VIETNAM: A STUDY OF ORGANIZATION AND STRATEGY,
American Univ Washington D C Center for Research in Social Systems
Michael Charles Conley. Mar 67, 477p
DA-PAM-550-106

Descriptors: (*Communism, *Vietnam), Insurgency, Political science, Social psychology, Economics, Military strategy, Government (Foreign), Organizations, Communists, Vulnerability, Armed forces (Foreign).

The study seeks to achieve three major goals. First, it attempts to describe the infrastructure of the Communist-dominated insurgency in South Vietnam which evolved during the period 1954-1965. Second, in the light of the organizational composition of that movement, it analyzes the strategy pursued by the insurgents on the political, sociopsychological, economic, and paramilitary levels in their effort to displace the formal government of the country with the agencies of a new administrative structure upon which a future totalitarian regime might be constructed. Last, the study attempts to place the more conventionally military content of the conflict in context by examining it in terms of the spectrum of organizations and highly varied activities which collectively constitute the reality of the threat that has been generated in the course of the last decade. (Author)
AD-656 941 HC$3.00 MF$0.65

POLITICAL DEVELOPMENT AS A POLICY SCIENCE: A POLEMIC,
Rand Corp Santa Monica Calif
Seyom Brown. Aug 67, 17p Rept no. P-3650
Availability: Published in Copyrighted journal.

Descriptors: (*Foreign policy, *Decision making), (*Government (Foreign), *Management planning), Political science, Culture, Sociology, Economics, Budgets, Effectiveness.

The foreign assistance agencies need to be able to plan and program for this 'political' side of the modernization process when decisions from among alternative foreign assistance programs and projects are called for. The White House and the Congress have indicated to AID that they are not satisfied with program evaluations stated almost exclusively in terms of economic indicators of development. And they are beginning to call for political indicators more meaningful than the way a country votes in the United Nations on East-West issues or its formal alliance memberships. The profession of political science will be expected to render advice to the policymaker on the essential political questions of constitutionalism, regime, the representative system, center-local relationships, civil liberties. It is time to refurbish this competency.
AD-657 002 Not available from CFSTI.

REVIEW OF 'CHANGING PATTERNS OF ADMINISTRATION IN RURAL EAST PAKISTAN',
Rand Corp Santa Monica Calif
Wayne Wilcox. Aug 67, 5p Rept no. P-3647

Descriptors: (*Government (Foreign), Pakistan), Rural areas, Political science, Suburban areas, Leadership, Management engineering, Economics, Social sciences, Reports, South Asia.

A very brief review of the book Changing Patterns of Administration in Rural East Pakistan which was prepared at the Asian Studies Center, Michigan State University.
AD-657 007 HC$3.00 MF$0.65

THE CHINESE COMMUNIST POLITBURO AND ITS OPERATIONAL CODE: A FEASIBILITY STUDY.
Stanford Univ Calif
For primary bibliographic entry see Field 5J.
AD-657 249 HC$3.00 MF$0.65

SYSTEMS ANALYSIS AND THE POLITICAL PROCESS,
Rand Corp Santa Monica Calif
James R. Schlesinger. Jun 67, 32p Rept no. P-3464

Descriptors: (*Decision making, *Cost effectiveness), (*Systems engineering, *Political science), Natural resources, Operations research, Federal budgets, Department of Defense, United States government, Attitudes.

The author evaluates the role for systems analysis particularly as it functions in a highly politicized environment.
AD-657 313 HC$3.00 MF$0.65

INDONESIA'S CONVALESCENCE,
Rand Corp Santa Monica Calif
Guy J. Pauker. Aug 67, 14p Rept no. P-3652
Availability: Published in The Round Table 14p Oct 1967.

Descriptors: (*Indonesia, Political science), (*Government (Foreign), *Leadership), Communism, Population, Economics, Money, Commerce, Armed forces (Foreign), Stabilization.

An analysis of the Indonesian situation at this time leads to the conclusion that in the next few years the country's convalescence will depend almost completely on General Suharto's wisdom and strength of character.
AD-657 490 Not available from CFSTI.

TRANS-NATIONAL SOCIETY, SOVEREIGNTY, AND LEADERSHIP: THE ENVIRONMENT OF FOREIGN POLICY,
Rand Corp Santa Monica Calif
Horst Mendershausen. Aug 67, 46p Rept no. P-3662
Availability: Published in Hard copy available from RAND Corp., Santa Monica, Calif., price $2.00.

Descriptors: (*Foreign policy, Environment), International law, Treaties, Government (Foreign), United States Government.

Contents: Is there an international order; The dual pattern of order (reality and unreality of the two patterns, trans-national society, sovereign states); International camps and leadership (origins, prerequisites, management, decay); The environment of foreign policy (the environment, the United States).
AD-657 523 Not available from CFSTI.

5E. Human Factors Engineering

A SUGGESTED GENERAL SOP FOR THE PREPARATION OF EQUIPMENT SERVICEABILITY CRITERIA.
George Washington Univ Alexandria Va Human Resources Research Office
For primary bibliographic entry see Field 15E.
AD-656 808 HC$3.00 MF$0.65

HUMAN FACTORS IN AVIATION: SOME RECURRENT PROBLEMS AND NEW APPROACHES,
George Washington Univ Alexandria Va Human Resources Research Office
For primary bibliographic entry see Field 5I.
AD-656 971 HC$3.00 MF$0.65

STIMULUS PRE-DIFFERENTIATION AS A FACTOR IN TRANSFER OF TRAINING.
Technical rept.,
Connecticut Coll New London
R. M. Gagne, and Katherine E. Baker. 1 Aug 49, 21p
SPECDEVCEN-316-1-7
Contract N7onr-316 (01)

Descriptors: (*Transfer of training, Motor reactions), Reaction (Psychology), Psychomotor tests, Learning, Training devices, Effectiveness, Reflexes, Performance (Human), Human engineering.

The experiment investigated the transfer to a discriminative motor task from various amounts of training involving 'stimulus pre-differentiation.' Such training established separate responses to the stimuli of the motor task, thereby aiding in differentiating among the stimuli; but the responses were unrelated to those of the final task, so training did not serve in any way to establish the motor responses required. In the present case, the subjects practiced associating four letters with four light stimuli which later signalled manual responses to four switches in the motor task. Four matched groups of 32 subjects were given 0, 8, 16 and 32 trials of this training prior to 60 trials of practice on the motor task. Performance on the motor task was measured in terms of the time required for each correct response, and in terms of number of errors. Transfer effects were shown by comparison of the performance of the 0-trial group (control) with that of the groups receiving training in 'stimulus pre-differentiation.' (Author)
AD-657 191 HC$3.00 MF$0.65

STUDIES IN COMPLEX COORDINATION. I. PERFORMANCE ON THE TWO-HAND COORDINATOR AS A FUNCTION OF THE PLANES OF OPERATION OF THE CONTROLS.
Technical rept.,
Rochester Univ N Y Dept of Psychology
Eugenia B. Norris, and S. D. S. Spragg. Aug 50, 19p
SPECDEVCEN-241-6-3
Contract N6onr-241 (06)

Descriptors: (*Motor reactions, Performance (Human)), (*Control knobs, *Human engineering), Operators (Personnel), Tracking, Target acquisition, Rotation, Hands, Learning, Analysis of variance, Accuracy, Display systems.

The investigation was designed so that the accuracy of performance of a complex two-hand motor coordination task as a function of the planes of rotation of the controls might be ascertained. Nine different combinations of planes, which were selected on the basis that they be feasible in terms of equipment design, were employed. (Author)
AD-657 192 HC$3.00 MF$0.65

SUGGESTIONS CONCERNING DESIRABLE DISPLAY CHARACTERISTICS FOR AIRCRAFT INSTRUMENTS.

Technical rept.,
Emmanuel Coll Boston Mass Oriental Science Library
A. C. Williams. Jul 49, 18p
SPECDEVCEN-71-16-4
Contract N6ori-71 (16)

Descriptors: (*Flight control systems, Design), (*Display systems, Human engineering), Instrument panels, Pilots, Errors, Performance (Human).

The display characteristics referred to in this report are those which determine the speed and accuracy with which aircraft instrument displays may be inte preted and used by pilots and other operators. They in no way refer to the engineering criteria which displays must meet. It is recognized that the best displays from the pilot's point of view are not always feasible because of cost, complexity, size, weight, etc. In the final selection of displays for use in aircraft compromises must be made between these factors. In cases of compromise where a choice exists between displays having different characteristics suggestions are offered as a guide to selection. (Author)
AD-657 194 HC$3.00 MF$0.65

A METHOD OF INCREASING THE MANEUVERABILITY OF HIGH SPEED AIRCRAFT WITHIN THE LIMITS OF HUMAN TOLERANCE TO g FORCES,
Psychological Corp New York
For primary bibliographic entry see Field 1C.
AD-657 449 HC$3.00 MF$0.65

A STUDY OF THE MOVING FIGURE AND ORIENTATION OF SYMBOLS ON PICTORIAL AIRCRAFT INSTRUMENT DISPLAYS FOR NAVIGATION.
Technical rept.,
Illinois Univ Urbana Dept of Psychology
Thomas A. Payne. 11 Jul 50, 26p
SPECDEVCEN-71-16-6
Contract N6ori-71 (16)
Report on project Human Engineering Systems Studies.

Descriptors: (*Instrument panels, Display systems), (*Navigation, Display systems), Aircraft, Symbols, Human engineering, Pilots, Performance (Human), Errors.

The study consisted of two separate experiments. In both experiments private pilots drew solutions to navigation problems, using printed drawings of pictorial aircraft instrument displays. The purpose of the first experiment was to compare performances of the subjects in drawing the movement which would be made by the moving figure of the display throughout the solution of the problem, when the moving figure represented (1) the station, and (2) the aircraft. (When the station moved, the aircraft was represented at the center of the display and heading was always straight up the face of the display. When the aircraft moved, the station was in a fixed position.) Results of the first experiment showed that it took over seven times as long to work the station movement problems, with only one fifth of them correct, as it took to work the aircraft movement problems, with four fifths of them correct. The purpose of the second experiment was to compare performances of private pilots in drawing the figure movement for the solutions to navigation problems when the moving figure always represented the aircraft and in which there were different arrangements of two variables, namely, (1) the location of the fixed station, and (2) the orientation of the compass rose ('North' at the top of the display or 'North' not at the top). (Author)
AD-657 470 HC$3.00 MF$0.65

A STUDY OF FACTORS AFFECTING OPERATION OF THE VG REMOTE PPI,
Johns Hopkins Univ Baltimore Md Psychological Lab
For primary bibliographic entry see Field 17I.
AD-657 477 HC$3.00 MF$0.65

5G. Linguistics

RESEARCH LABORATORY OF ELECTRONICS QUARTERLY PROGRESS REPORT NO. 86, JULY 15, 1967,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 20I.
AD-656 868 HC$3.00 MF$0.65

LINGUISTIC PROBLEMS OF DENOTATION,
Rand Corp Santa Monica Calif
David G. Hays. Aug 67, 7p Rept no. P-3645
Prepared for presentation at International Congress of Linguists (10th), Bucharest 28 Aug-2 Sep 67.

Descriptors: (*Linguistics, *Psychology), (*Perception (Psychology), *Learning), Identification, Language, Culture, Speech, Performance (Human), Sensory mechanisms, Psychometrics.

The uniformity of human culture and language argue that the form in which knowledge is stored is innate, but most of the content is learned and no person knows all about his world or his own language. Some few properties must be available to almost every human creature, but others are available only in one culture or one art. What is analytic to most adults may be a mere fact to every child. Learning includes the addition of event statements, instantial and general; formation of generalizations; and establishment of new properties. How learning takes place is a psychological problem; linguistics can help solve it by contributing to knowledge about knowledge.
AD-657 006 HC$3.00 MF$0.65

ABSTRACT FAMILIES OF LANGUAGES,
System Development Corp Santa Monica Calif
Seymour Ginsburg, and Sheila Greibach. 17 Apr 67, 60p Rept no. Scientific-5, TM-738/031/00
AFCRL-67-0363
Contract F19628-67-C-0008, Grant AF-AFOSR-1203-67
See also AD-657 016.

Descriptors: (*Language, *Transducers), Theorems, Automation, Operations research, Systems engineering, Computational linguistics, Set theory, Grammars, Context free grammars, Context sensitive grammars, Sequences, Mapping (Transformations), Symbols.

The notion of an abstract family of languages (AFL) as a family of sets of words satisfying certain properties common to many types of formal languages is introduced. Operations preserving AFL are then considered. The concept of an abstract family of acceptors (AFA) is also introduced and shown to give rise to an AFL. A necessary and sufficient condition on an AFL is presented in order that the AFL come from some AFA. Finally, abstract families of transducers (AFA with output) are discussed. (Author)
AD-657 015 HC$3.00 MF$0.65

A NOTE ON PRESERVATION OF LANGUAGES BY TRANSDUCERS,
System Development Corp Santa Monica Calif
Seymour Ginsburg, and Gene F. Rose. 23 May 67, 11p Rept no. Scientific-6, TM-738/032/00
AFCRL-67-0364
Contract F19628-67-C-0008, Grant AF-AFOSR-1203-67
See also AD-657 015.

Descriptors: (*Language, Transducers), Automation, Preservation, Theorems, Context free grammars, Symbols, Algebras, Context sensitive grammars, Mathematical logic, Linear systems.

An error in a previous paper is corrected. The rectified version involves pushdown transducers with accepting states instead of pushdown transducers. Some properties of pushdown transducers with accepting states are then noted.
AD-657 016 HC$3.00 MF$0.65

AUTOMATIC ENGLISH SENTENCE ANALYSIS.
Final scientific rept.,
P E C Research Associates Inc Athens Ga
Ernst von Glasersfeld, and Brian Dutton. May 67, 17p
AFOSR-67-1887
Contract F44620-67-C-0028

Descriptors: (*Semantics, *English language), Classification, Language, Analysis, Computers, Automatic, Linguistics.

The report includes a preliminary study of causative verbs in English and Arabic that shows the existence of common semantic factors in both languages. A method is indicated for developing a finite system of semantic modifiers which, with a relatively small number of sememes, can generate adjectival, verbal, nominal, and other forms, in the evolution of a semantic dictionary. (Author)
AD-657 043 HC$3.00 MF$0.65

THE EQUIVALENCE OF CONTEXT LIMITED GRAMMARS TO CONTEXT FREE GRAMMARS,
System Development Corp Santa Monica Calif
Thomas N. Hibbard. 16 Jan 67, 66p Rept no. Scientific-4, TM-738/030/00
AFCRL-67-0434
Contracts F19628-67-C-0008, AF-AFOSR-1203-67

Descriptors: (*Context free grammars, Analysis), (*Phrase structure grammars, Analysis), Language, Theory.

A grammar G is context limited if there exists a partial ordering on the alphabet of G under which, for every production alpha to beta of G, every letter of alpha is smaller than some letter of beta. It is proved that the languages generated by context limited grammars are just the context free languages. Unambiguity of general grammars is defined and discussed carefully, preparatory to proving that the languages generated by unambiguous context limited grammars are just the unambiguous context free languages. (Author)
AD-657 317 HC$3.00 MF$0.65

COMPUTER AND INFORMATION SCIENCES-II,
Battelle Memorial Inst Columbus Ohio Columbus Labs
For primary bibliographic entry see Field 9B.
AD-657 347 Not available from CFSTI.

STUDIES IN THE PHONOLOGY OF ASIAN LANGUAGES. V. ACOUSTIC FEATURES IN THE MANNER-DIFFERENTIATION OF KOREAN STOP CONSONANTS.
Technical rept. Jul 66-Jul 67,
University of Southern California Los Angeles Acoustics Phonetics Research Lab
Mieko S. Han, and Raymond S. Weitzman. 15 Jul 67, 57p
Contract Nonr-228 (28)
See also AD-637 827.

Descriptors: (*Language, Asia), (*Phonetics, Analysis), Speech, Acoustics, Speech representation.
Identifiers: Korean language.

In Korean nine stop consonants--the aspirated bilabial, dental, and velar stops; the weak bilabial, dental, and velar stops; and the strong bilabial, dental, and velar stops--contrast with each other. In order to determine those acoustic features involved in the manner differentiation of these stops, a fairly large amount of data was collected, and a number of speech synthesis experiments were carried out using the tape cutting and splicing method. These studies revealed that aspirated stops are distinguished from weak and strong stops primarily by the timing of the voice onset. Aspirated stops were found to be 2.4 to 5.3 times longer than weak stops and even longer than this compared to strong stops. The cues for the distinction between weak and strong stops seem to be (1) the intensity build-up in the first few centiseconds of voicing following stop release, which is generally slower with weak stops than with strong stops and (2) the peak amplitude of the first period of voicing. These findings indicate that the difference between these stops is a function of the slope of the leading edge of the intensity contour during the first few centiseconds of voicing following the stop release. Relative to a given speaker, if the slope rises abruptly, the stop will be heard as strong, and if it rises gradually, the stop will be heard as weak. (Author)
AD-657 384 HC$3.00 MF$0.65

5H. Man-Machine Relations

RESEARCH ON INTELLIGENT QUESTION-ANSWERING SYSTEM,
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 9B.
AD-656 789 HC$3.00 MF$0.65

PERFORMANCE STUDIES ON THE NOTS-UCLA TRACKING SIMULATOR: AN INVESTIGATION OF OPERATOR PREDICTIVE BEHAVIOR ON TWO-DIMENSIONAL COMPENSATORY TRACKING.
Biotechnology Lab. technical rept.,
California Univ Los Angeles Dept of Engineering
Russell L. Smith, and John Lyman. Jun 67, 30p
Rept no. TR-40, 67-32
Contract N123 (60530)32857A

Descriptors: (*Tracking, Performance (Human)), Target acquisition, Operators (Personnel), Predictions, Behavior, Trajectories, Training, Analysis of variance, Experimental design, Simulators, Man-machine systems, Proprioception.

The experiment assessed the extent to which operators employed predictive behavior on two-dimensional tracking. Two problems were presented: in one, operators were asked to extrapolate an overlearned trajectory upon the disappearance of the target and in the other, operators tracked one of four possible trajectories with and without pretest knowledge concerning the specific trajectory that would be presented. No evidence was found which suggested that operators exhibited predictive behavior on the bases of trajectory experience, immediate past history of the target, or expectancies derived from the pre-test trajectory information. The results also indicated that tracking error is largely a function of trajectory pattern, rather than the actual target dynamics (velocity, acceleration), and that error magnification facilitated performance on all patterns. (Author)
AD-657 182 HC$3.00 MF$0.65

THE TRACKING LOOP: A CRITICAL REVIEW OF TRACKING AND RELATED SENSORIMOTOR STUDIES.
Biotechnology Lab. technical rept.,
California Univ Los Angeles Dept of Engineering
Russell L. Smith, and John Lyman. Feb 66, 63p
Rept no. TR-32, 66-21
Contract N123 (60530)32857A

Descriptors: (*Tracking, Performance (Human)), Man-machine systems, Display systems, Central nervous system, Motor reactions, Visual perception, Behavior, Reaction (Psychology), Reflexes, Simulators, Operators (Personnel), Detection, Memory, Predictions, Target acquisition, Muscles, Neuromuscular transmission.

The report discusses the man-machine tracking system in terms of its elemental components from system input to system output. Forcing functions, display and control characteristics, central nervous system data processing and sensorimotor capabilities and limitations, are examined in an amount of detail suit to the problem. Relevant literature is critically reviewed and attempts are made to integrate findings, formulate explanatory concepts and hypotheses, and present design implications. Relative to the requirements of the tracking system, it is concluded that man's visual capabilities are more than adequate, motor capabilities lack thorough exploration, and that predictive behavior and reaction time lags impose severe constraints. It is further concluded that the effectiveness of the human operator could be significantly enhanced by taking advantage of his natural attributes and providing practical, cost-effective machine assists in those areas where his inputs are weakest with respect to the total system. (Author)
AD-657 183 HC$3.00 MF$0.65

PERFORMANCE STUDIES ON THE NOTS-UCLA TRACKING SIMULATOR: FINAL REPORT.
Biotechnology Lab. technical rept.,
California Univ Los Angeles Dept of Engineering
Russell L. Smith, and John Lyman. Jun 67, 35p
Rept no. TR-41, 67-33
Contract N123 (60530)32857A

Descriptors: (*Tracking, Performance (Human)), Display systems, Control systems, Sensory perception, Trajectories, Predictions, Behavior, Operators (Personnel), Learning curves, Simulators.

The report summarizes the principal findings from a series of human tracking experiments conducted on the high inertia NOTS-UCLA tracking simulator. Emphasis in the series was on displays, controls, multiple sensory cues, trajectory characteristics, and predictive behavior of the human operator. Results from various studies relevant to particular parameters are integrated to provide continuity. Theoretical and practical implication of the data are discussed in relation to design of range tracking systems. Limitations of findings are also discussed and reference is made to areas which appear in greatest need of continued research. (Author)
AD-657 184 HC$3.00 MF$0.65

VISIBILITY ON CATHODE-RAY TUBE SCREENS: SIGNALS ON A P7 SCREEN SEEN AT DIFFERENT INTERVALS AFTER EXCITATION,
Johns Hopkins Univ Baltimore Md Dept of Psychology
For primary bibliographic entry see Field 20F.
AD-657 515 Not available from CFSTI.

VISIBILITY ON CATHODE-RAY TUBE SCREENS. SCREEN BRIGHTNESS,
Johns Hopkins Univ Baltimore Md
For primary bibliographic entry see Field 20F.
AD-657 520 Not available from CFSTI.

THEORY AND METHODS FOR ANALYZING ERRORS IN MAN-MACHINE SYSTEMS,
Johns Hopkins Univ Baltimore Md
Alphonse Chapanis. 1951, 25p
SPECDEVCEN-166-1-49
Contract N5ori-166 (01)
Availability: Published in Annals of the New York Academy of Sciences v51 Art7 p1179-203 Jan 1951.

Descriptors: (*Radar equipment, *Man-machine systems), Performance (Human), Errors, Measurement, Statistical analysis, Control systems.

Systems Research is a broad research program covering a great variety of fundamental and applied studies on naval information systems. Two important objectives of this program are: (a) the evaluation of naval radar equipment in terms of the accuracy, kind, and amount of information an operator can extract from it, and (b) the development of suitable techniques for carrying out these evaluations. The results of our efforts to accomplish the second objective form the substance of this paper. Our primary interst in these methods has been directed toward the solution of radar problems, but it has become increasingly apparent that the concepts involved apply equally well to many other kinds of intricate systems, such as are found in modern industry. Although we have had no occasion to observe these techniques at first hand in industrial situations, examples of their use can be found. Several industrial examples have been used in this paper to show the generality of the methods and possibly to suggest still further applications.
AD-657 522 Not available from CFSTI.

5I. Personnel Selection, Training, and Evaluation

AN EXPERIMENT IN BASIC AIRBORNE ELECTRONICS TRAINING. PART III. EFFECT OF REDUCTION IN PREVIOUS TRAINING UPON ABILITY TO LEARN OPERATIONAL EQUIPMENT,
Naval Personnel Research Activity San Diego Calif Navy Training Research Lab
Alexander A. Longo, and G. Douglas Mayo. Mar 67, 16p
NPRA-STB-67-19-Pt-3
See also AD-656 436.

Descriptors: (*Electronics, *Military training), Airborne, Learning, Electronic technicians, Time studies, Radar operators, Aviation personnel.

A longitudinal study was made pertaining to whether training time can be reduced in basic airborne radar technician training through judicious revision of the course. The study compared the relative performance of two matched groups of 29 men each on the basis of their ability to learn a representative item of operational equipment for which the Aviation Electronics Technician (Radar and Radar Navigation System) is responsible. The results indicated that, despite the reduction of the original course from 30 weeks to 22 weeks, graduates of the revised course achieved the objectives of the representative equipment course as well as did graduates of the longer course. Based upon this information in conjunction with the information provided by the two previous reports and certain logical considerations, basic airborne radar technician training was reduced from 30 weeks to 25 weeks. (Author)
AD-656 893 HC$3.00 MF$0.65

COMPARISON OF CONVENTIONAL AND PROGRAMMED INSTRUCTION IN TEACHING COMMUNICATIONS PROCEDURES,
Naval Personnel Research Activity San Diego Calif Navy Training Research Lab
Kirk A. Johnson, and Robert O. Baldwin. May 67, 22p
NPRA-STB-67-20

Descriptors: (*Teaching methods, Effectiveness), Programmed instruction, Communication systems, Naval training, Performance (Human), Naval personnel.

Comparisons were made between programmed and conventional instruction within the schools of the Naval Air Technical Training Command. In this study a comparison was made between two versions of the Airborne Radio Code Operator (ARCO) Course. In the Conventional version, Military Communication Procedures was taught by means of lecture-discussion sessions; in the Program version, this same material was taught by means of programmed booklets. The students in the Program version required a total of 14.5 hours to cover this material, as opposed to a total of 30 hours required for the lecture-discussion sessions of the Conventional version. This afforded a savings of better than 50% over this particular portion of the course, and a savings of two days in the total length of the course. Mastery of the material was measured by means of two special tests. On the multiple choice test, the Conventional group was found to be slightly better than the Program group; on the short answer test, the Program group was found to be slightly better than the Conventional group. The difference favoring the Program group was somewhat larger than the difference favoring the Conventional group. (Author)

AD-656 894 HC$3.00 MF$0.65

THE FUNCTIONAL CONTEXT METHOD OF INSTRUCTION,

George Washington Univ Alexandria Va Human Resources Research Office

Harry A. Shoemaker. Jul 67, 9p Rept no. Professional Paper 35-67

Contract DA-44-188-ARO-2

Availability: Published in IRE Transactions on Education vE3 n2 p52-7 Jun 1960.

Descriptors: (*Teaching methods, *Electronics), (*Electronic technicians, Training), Maintenance, Radio equipment, Instructors, Tests, Maintenance personnel.

The paper describes the functional context method of instruction for radio repair training. Although limited to electronics, it is applicable in other types of training. The basic premise of the method is twofold: The context of the material to be learned must be meaningful to the learner and must at the same time be directly relevant to the goals of the training program. A 'whole-to-part' training sequence is used rather than the conventional 'part-to-whole' method. Within this framework, basic electronics is taught in the broader context of overall equipment functions and maintenance operations. (Author)

AD-656 939 Not available from CFSTI.

HUMAN FACTORS IN AVIATION: SOME RECURRENT PROBLEMS AND NEW APPROACHES,

George Washington Univ Alexandria Va Human Resources Research Office

Wallace W. Prophet. Jun 67, 23p Rept no. Professional Paper 30-67

Contract DA-44-188-ARO-2

Presented at the Alabama Psychological Association Annual Meeting, Mobile, May 1967.

Descriptors: (*Aviation personnel, Performance (Human)), (*Training, Aeronautics), Flight simulators, Predictions, Simulation, Performance tests, Pilots.

Three areas of human factors concern in aviation--performance assessment, prediction of performance, and simulation in training--are discussed. Emphasis is placed on the necessity for providing objective and standardized evaluation of flight trainees, rather than using the unreliable subjective evaluation methods. Methods for predicting trainees' performance, particularly in combat situations, are being sought. Use of simulation in training helicopter pilots has been minimal, but recently two devices were developed to provide better transfer of training from the device to the actual helicopter situation. (Author)

AD-656 971 HC$3.00 MF$0.65

LINGUISTIC PROBLEMS OF DENOTATION,

Rand Corp Santa Monica Calif

For primary bibliographic entry see Field 5G.

AD-657 006 HC$3.00 MF$0.65

THE PERFORMANCE OF THE FARNSWORTH LANTERN AT THE SUBMARINE MEDICAL RESEARCH LABORATORY AND IN THE FIELD FROM 1955 TO 1965,

Naval Submarine Medical Center Groton Conn Submarine Medical Research Lab

For primary bibliographic entry see Field 6N.

AD-657 059 HC$3.00 MF$0.65

QUANTITATIVE METHODS IN COMPUTER-DIRECTED TEACHING SYSTEMS.

Final rept.,

Stanford Univ Calif Inst in Engineering-Economic Systems

Richard D. Smallwood, Iram J. Weinstein, and James E. Eckles. 15 Mar 67, 171p

Contract Nonr-225 (84)

Descriptors: (*Education, Systems engineering), (*Teaching methods, Systems engineering), Programmed instruction, Mathematical models, Learning, Decision making, Dynamic programming, Decision theory, Optimization, Time sharing, Computers, Operations research.

The report formulates in quantitative terms the decision problem associated with the design of a computer-directed teaching system. This formulation is then used to direct a theoretical inquiry into some of the aspects of this problem that are relevant to the design of a quantitative decision process within a practical teaching system. Some of the problems attacked include: the development of a class of models for conceptual learning, the study of a decision theoretic procedure for the selection of the model from a class of models, the investigation of optimum teaching strategies (in an economic sense) for a simple learning model, the derivation of the optimum quantization of a past history parameter for a simple teaching system, a consideration of the information-reward trade off in computer-directed teaching systems, and a preliminary formulation of the optimum design problem for a time-shared teaching system. The report concludes with a discussion of directions for future research. (Author)

AD-657 190 HC$3.00 MF$0.65

STIMULUS PRE-DIFFERENTIATION AS A FACTOR IN TRANSFER OF TRAINING.

Connecticut Coll New London

For primary bibliographic entry see Field 5E.

AD-657 191 HC$3.00 MF$0.65

TEACHING THE USE OF THE LIBRARY TO UNDERGRADUATES: AN EXPERIMENTAL COMPARISON OF COMPUTER-BASED INSTRUCTION AND THE CONVENTIONAL LECTURE METHOD,

Illinois Univ Urbana Coordinated Science Lab

Marina E. Axeen. Aug 67, 208p Rept no. R-361

Contracts DA-28-043-AMC-00073 (E), Nonr-3985 (08)

Descriptors: (*Teaching methods, *Libraries), (*Programmed instruction, Libraries), Effectiveness, Computer programs, Indexes, Training devices, Students, Learning, Performance (Human), Teaching machines.

Identifiers: PLATO teaching system.

The overall objectives of the present study were (1) to provide specific information concerning the effectiveness of computer-based instruction in teaching the use of the library; (2) to compare the effectiveness of an automated programed instruction with the conventional lecture method as these relate to the knowledge students obtained; (3) to compare the amount of instructor's time necessary to prepare and teach by computer-based instruction with the time spent in preparation and delivery of lectures in the classroom; (4) to compare the amount of time it took to cover the content of the course. Specifically the writer tested the following hypothesis: Undergraduate students taught how to use an academic library by programed instruction would learn as much, in less time with less instructional assistance, than would undergraduates taught by the conventional lecture method. This paper presents a detailed description of the study, and a discussion of the results of the study in the light of the objectives outlined above. This paper also includes a general outline of the PLATO Teaching System. (Author)

AD-657 216 HC$3.00 MF$0.65

JOB ANALYSIS: AN ASSESSMENT OF APPLICABILITY OF ANALYSIS SYSTEMS OF OTHER SERVICES TO NAVY ENLISTED BILLETS,

Naval Personnel Program Support Activity Washington D C Personnel Research Lab

Mark E. Johnson. Nov 66, 49p Rept no. WRM-67-9

See also AD-649 555.

Descriptors: (*Job analysis, Personnel management), (*Personnel management, Naval personnel), Inventory, Questionnaires, Training, Computers, Information retrieval, Data storage systems, Data processing systems.

As a basis for approaching the development of a Navy job analysis system, the standard procedures in job analysis are analyzed and reviewed, together with recent developments in the field. Limitations upon the research are identified, and some of the underlying assumptions are indicated. Criteria for a Navy job analysis system are proposed. Industrial and governmental practices in job analysis are discussed, particularly the systems followed by the U. S. Marine Corps, the U. S. Air Force, and the U. S. Army, and their use for Navy purposes is appraised. Procedures followed by the U. S. Department of Labor are also examined. It is concluded that, while certain aspects of the Air Force and Marine Corps job analysis systems may pertain to the Navy, a job analysis system which is satisfactory for the Navy must be developed to accommodate the Navy's unique characteristics and requirements. (Author)

AD-657 345 HC$3.00 MF$0.65

A PLAN FOR THE ESTABLISHMENT OF A COMPUTER-AIDED INSTRUCTION RESEARCH AND DEVELOPMENT CENTER.

Final rept. 17 Oct 66-16 Jul 67,

General Learning Corp Washington D C

Donald V. Torr, Sam Molello, and James J. Prevel. Jul 67, 200p

Contract N00014-67-C-0219

Descriptors: (*Programmed instruction, *Computers), Feasibility studies, Computer personnel, Learning, Performance (Human), Costs, Time sharing, Input-output devices, Personnel management.

Identifiers: Computer-aided instruction, Computer software, Computer hardware.

The report presents a plan for the establishment of a Computer-Aided Research and Development Center. The plan identifies computer systems, personnel, and facility requirements. A five-year implementation schedule and a five-year cost estimate are provided. (Author)

AD-657 348 HC$3.00 MF$0.65

TRAINING, TASKS AND MEDIATOR ORIENTATION IN HETEROCULTURAL NEGOTIATIONS.

Illinois Univ Urbana Group Effectiveness Research Lab
For primary bibliographic entry see Field 5J.
AD-657 353 HC$3.00 MF$0.65

THE USE OF CUING IN TRAINING TASKS: PHASE III.
Final technical rept. 22 Oct 65-22 Oct 66,
Hull Univ (England)
John Annett, and Laura Paterson. Aug 67, 40p
NAVTRADEVCEN-4717-1
Contract N62558-4717
See also AD-601 352.

Descriptors: (* Sonar personnel, * Training), (* Auditory perception, * Reaction (Psychology)), Pitch discrimination, Sensitivity, Auditory signals, Detection, Transfer of training, Signal-to-noise ratio, Learning, Feedback, Effectiveness.
Identifiers: Cues (Stimuli).

The present study investigates three potentially trainable discriminations, the relative pitch, intensity and duration of pairs of signals embedded in noise. These are relevant to the active sonar cues for doppler, echo strength and echo length respectively. It is emphasized that no statement on trainability can be final until all methods reasonably likely to be successful have been investigated. This study compares three methods, (a) cuing, in which the trainee is informed just before each pair of signals what the correct response should be, (b) knowledge of results in which he gets the same information just after hearing the signals and making his responses and (c) a mixed cuing/KR condition in which training begins with cuing and later transfers to KR. The results show that all three methods are effective for pitch and intensity judgments but that none is effective for judgments of relative duration. Training effects, although significant, are generally small and occur early in practice. The results confirm the suggestion that previously found differences between cuing and KR are due to manipulation of response criterion rather than differential effects on sensitivity and they confirm the view that learning in these cases is best described by a simple associative model rather than an S-R reinforcement model. (Author)
AD-657 367 HC$3.00 MF$0.65

PRACTICAL PRINCIPLES GOVERNING THE PRODUCTION AND UTILIZATION OF SOUND MOTION PICTURES.
Special rept.,
Pennsylvania State Univ University Park
C. R. Carpenter. 1 Aug 50, 20p Rept no. SR-1
Contract N6onr-269 (07)

Descriptors: (* Training films, Effectiveness), Education, Motion pictures, Production, Learning.

The educational effectiveness of films can be improved, but to do so steps must be taken all along the line from the origin of the film idea to the utilization of the film in instruction, and not simply at the production stage. The effectiveness of films in instruction depends on the relationship of the film content to the audience and the context of their use, and not simply on the film itself. Within the film, treatment of the content in terms of psychological and instructional principles governing audience reaction is of greatest importance. Film techniques involving special effects and elaborate musical scores are of minor importance. Of all the devices of mass communication, motion pictures and their counterpart, television, are unquestionably the most powerful. (Author)
AD-657 459 HC$3.00 MF$0.65

THE EFFECTS OF AN INTERFERING TASK ON THE LEARNING OF A COMPLEX MOTOR SKILL.
Technical rept.,
Connecticut Coll New London
Robert M. Gagne, Katherin E. Baker, and Ruth C. Wylie. 12 Aug 49, 26p
SPECDEVCEN-316-1-9
Contract N7onr-316 (01)
Report of project Human Engineering Synthesis of Basic Information.

Descriptors: (* Learning, Motor reactions), Interference, Transfer of training, Learning curves, Training, Effectiveness.

An experiment is reported which deals with the effects of introducing an interfering task at various stages during the learning of a motor skill. The motor skill used was the Complex Coordination Test, which requires the subject to make alignments of three sets of red and green lights by movement of a stick and rudder which resemble the controls of an airplane. The interfering Task consisted of appropriate forward and backward movements of a gear shift arrangement at the subject's left in response to the appearance of a red or green light on the extreme left side of the Complex Coordinator panel. The experiment involved six groups of 22 college men, matched as to the time required to make the first eight Complex Coordinator settings. The learning was divided into six stages of 26 trials each, and the Interfering Task was introduced at different stages for the different groups. One group had the Interfering Task from Stage 1 onward, another from Stage 2 onward, etc. The performance of the Complex Coordination Task with and without the Interfering Task was measured in terms of the time required for making 26 settings at each learning stage. (Author)
AD-657 460 HC$3.00 MF$0.65

AUDIO AIDS TO BLIND FLYING AND A SCORING DEVICE FOR THE LINK TRAINER,
American Institutes for Research Pittsburgh Pa
C. S. Rhoads. Jul 49, 33p
SPECDEVCEN-370-2-1
Contract N7onr-370 (02)

Descriptors: (* Flight simulators, Effectiveness), (* Auditory signals, Training devices), Instrument flight, Pilots, Instrument panels.
Identifiers: Evaluation.

The purpose of the study was to develop methods and procedures for evaluation of the relative effectiveness with which a Link trainer can be flown using an apparatus known as 'flybar,' which was designed to give airplane pilots non-verbal auditory indications of turn, bank and pitch in flight.
AD-657 464 HC$3.00 MF$0.65

DIRECTIONS FOR INSTALLATION AND OPERATION OF VOICE COMMUNICATION TRAINING EQUIPMENT UTILIZING DEVICE 8-I.
Purdue Univ Lafayette Ind
For primary bibliographic entry see Field 17B.
AD-657 465 HC$3.00 MF$0.65

FREQUENCY DISTORTION IN THE DEVICE 8-I PORTABLE INTERPHONE TRAINER,
Purdue Univ Lafayette Ind
H. William Nordyke. 1948, 18p
SPECDEVCEN-104-2-1
Contract N6ori-104 (02)

Descriptors: (* Intercommunication systems, Distortion), (* Training devices, Intercommunication systems), Frequency, Portable, Capacitors, Corrections.

The tests of Device 8-I, serial No. 1 show the amount of frequency distortion to be extremely low. Almost flat response was obtained over the entire frequency limit of the audio oscillator. However, in the case of Device 8-I, serial No. 13, the response at moderate output level was so poor as to render the unit partially ineffective. Reasons for this poor response were centralized in the input stage. (Author)
AD-657 467 HC$3.00 MF$0.65

AN EXPERIMENTAL COMPARISON OF 5 CONDITIONS FOR VOICE COMMUNICATION TRAINING,
Purdue Univ Lafayette Ind
For primary bibliographic entry see Field 17B.
AD-657 469 HC$3.00 MF$0.65

EVALUATION OF THE PRIMARY FLIGHT HELMET, DEVICE 12-BK-6 (IMPACT-AUDIBLE SIGNAL SYSTEM FOR FLIGHT TRAINING).
Kenyon Coll Gambier Ohio
For primary bibliographic entry see Field 17B.
AD-657 474 Not available from CFSTI.

THE SEARCH FACTOR IN DETECTING WEAK RADAR TARGETS.
Johns Hopkins Univ Baltimore Md Psychological Lab
For primary bibliographic entry see Field 17I.
AD-657 478 HC$3.00 MF$0.65

REMARKS ON COLQUHOUN'S: 'THE EFFECT OF 'UNWANTED' SIGNALS ON PERFORMANCE IN A VIGILANCE TASK',
Antioch Coll Yellow Springs Ohio Behavior Research Lab
H. J. Jerison. Aug 67, 6p
AFOSR-67-1949
Grant AF-AFOSR-150-66
Availability: Published in Ergonomics, v9 n5 p413-6 1966.

Descriptors: (* Attention, Performance (Human)), Visual signals, Detection, Target discrimination, Probability.

Colquhoun's 1961 experiment is interpreted as emphasizing the discrimination phase of a complex task in which the detection of a signal is followed by the discrimination of one of its features. His conclusion that signal probability determines vigilance performance is supported by the present research with a simple detection task. The probability is redefined as the ratio of signals to attention-eliciting stimuli, and the latter stimuli must be presented at high rates (15 or more times per minute). Colquhoun's results with the complex task suggest an effect of signal probability on search and scanning patterns during prolonged visual work. (Author)
AD-657 479 Not available from CFSTI.

REPORT OF RESULTS OF LEARNING STUDIES WITH THE MARK 18 COORDINATION TRAINER DEVICE 3 - A - 40,
Tufts Univ Medford Mass Inst for Psychological Research
Mason Crook. Aug 46, 34p
SPECDEVCEN-58-1-2
Contract N5ori-58 (02)

Descriptors: (* Training devices, * Learning), Gunnery trainers, Targets, Training.

Ranging, tracking, and hits scores improve rapidly through five or six five-minute trials, and more slowly to the twentieth to twenty-fifth trial. Training on a variety of target cycles produces more gradual and long-continued improvement than training on one target cycle. Acceleration of learning as a result of earphones providing a supplementary cue for ranging cannot be conclusively demonstrated under present experimental conditions. Training transfers in a high degree to new target courses. (Author)
AD-657 485 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER '63 THRU SEPTEMBER 1966.

Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

5J. Psychology (Individual and Group Behavior)

EFFECT OF ACUTE EXPOSURE TO ALTITUDE ON TIME ESTIMATION,
Army Research Inst of Environmental Medicine Natick Mass
For primary bibliographic entry see Field 6S.
AD-656 822 Not available from CFSTI.

LEADERSHIP AND MOTIVATION, AN OPERATIONAL FORMULATION APPLICABLE TO UNCONVENTIONAL SITUATIONS,
Walter Reed Army Inst of Research Washington D C
David McK. Rioch. 1967, 14p
Availability: Published in Unidentified journal p71-84.

Descriptors: (*Social psychology, Leadership), (*Leadership, Motivation), Behavior, Social communication, Decision making, Organizations, Performance (Human), Military psychology, Insurgency, Counterinsurgency, Group dynamics, Culture.

In this paper, some limited aspects of the newer problems are considered, chiefly from the point of view of recent developments in the field of behavioral science and communication.
AD-656 823 Not available from CFSTI.

RESEARCH LABORATORY OF ELECTRONICS QUARTERLY PROGRESS REPORT NO. 86, JULY 15, 1967,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 20I.
AD-656 868 HC$3.00 MF$0.65

SOME EFFECTS OF DIFFERENTIAL PRETASK INSTRUCTIONS ON AUDITORY VIGILANCE PERFORMANCE,
George Washington Univ Alexandria Va Human Resources Research Office
G. L. Neal. Jul 67, 10p Rept no. Professional Paper 34-67
Contract DA-44-188-ARO-2
Prepared for presentation at the Southwestern Psychological Association Meeting, Houston, Texas, Apr 1967.

Descriptors: (*Attention, Performance (Human)), Motivation, Teaching methods.

In this study of the evaluation of pretask instruction effects on vigilance performance, the researchers made an assessment of demand characteristics. Subjects were 203 students from University of Oklahoma classes who were given four possible reasons for the experiment; the treatments were called Required Chore, Important Task, Subject Important, and Combined Treatments. It was demonstrated that subject motivation level via pretask instructions can influence the course of the monitor's performance, at least in the short run. (Author)
AD-656 942 HC$3.00 MF$0.65

PUPILLARY RESPONSES IN A PITCH-DISCRIMINATION TASK,
Michigan Univ Ann Arbor Dept of Psychology
Daniel Kahneman, and Jackson Beatty. 13 Dec 66, 7p
AFOSR-67-1826
Contract AF 49 (638)-1235
Availability: Published in Perception and Psychophysics v2 p101-5 1967.

Descriptors: (*Pitch discrimination, Responses), Eye, Muscles, Relaxation (Physiology), Psychophysiology, Attention, Sensory perception, Problem solving, Stimulation.

Pupils were measured while observers made pitch judgments under the method of constant stimuli. A substantial dilation occurs immediately after the presentation of the comparison tone, and the size of this response is closely correlated to the difficulty of the discrimination. Baseline changes occur within each block of trials, but have little effect on the magnitude of dilations. Responses to redundant stimuli, including the standard itself, decrease during the experimental session. The results support the validity of pupillary measurements as an index of processing load. (Author)
AD-656 965 Not available from CFSTI.

SELECTIVE ATTENTION,
Michigan Univ Ann Arbor Dept of Psychology
Howard Egeth. 25 May 66, 19p
AFOSR-67-1814
Contract AF 49 (638)-1235
Prepared in cooperation with Johns Hopkins Univ., Baltimore.
Availability: Published in Psychological Bulletin v67 n1 p41-57 1967.

Descriptors: (*Attention, Sensory perception), Selection, Auditory perception, Visual perception, Stimulation, Classification, Information theory.
Identifiers: Information processing (Psychology).

Research on selective attention in humans is discussed critically in this paper. Emphasis is placed on an analysis of the nature of the selectivity that is demonstrated in 4 experimental tasks: recognition of tachistoscopically presented materials, listening to one of several simultaneous auditory messages, speeded classification of multidimensional objects, and searching through complex visual fields. The results of these studies are interpreted in terms of coding strategies that Ss use in processing sensory input. (Author)
AD-656 966 Not available from CFSTI.

STIMULUS PRONUNCIABILITY IN AURAL PAIRED-ASSOCIATE LEARNING,
Michigan Univ Ann Arbor Dept of Psychology
Edwin Martin. 8 Sep 64, 8p
AFOSR-67-1827
Contract AF 49 (638)-1235
Availability: Published in Journal of Verbal Learning and Verbal Behavior v5 n1 þ18-22 Feb 1966.

Descriptors: (*Verbal behavior, *Learning), Word association, Recall, Retention.

An experiment was conducted in an attempt to assess the merits of a stimulus availability interpretation of stimulus pronunciability (PR) effects in aural paired-associate learning. Stimulus PR was varied within lists of 8 trigram-adjective pairs. The study-test technique was used. The intra-SR interval of study trials was either 2, 4, or 6 sec., thus allowing periods of different length in which to manipulate stimulus availability at the time of the response event. Subgroups of Ss either counted backwardly during this interval, repeated the stimulus aloud, or were left uninstructed. Stimulus recall was given at the end of learning without forewarning. The results indicate that stimulus repetition efficiently serves to maintain availability over the intro-SR interval. Counting backwardly during this interval, however, markedly impedes acquisition, but not differentially from the stimulus-repetition condition over levels of PR as would be expected from short-term retention studies involving pronunciability as a variable. The failure of the three intra-SR activities to interact over levels of PR both during acquisition and in post-acquisition stimulus recall makes differential availability (in the sense of recallability) according to PR an untenable explanation of stimulus-PR effects. (Author)
AD-656 967 Not available from CFSTI.

ACQUISITION OF HIERARCHICAL CONTROL OVER THE TEMPORAL ORGANIZATION OF A SKILL.
Doctoral thesis,
Michigan Univ Ann Arbor Dept of Psychology
Richard W. Pew. 10 Feb 65, 10p
AFOSR-67-1837
Contract AF 49 (638)-1235
Availability: Published in Journal of Experimental Psychology v71 n5 p764-71 1966.

Descriptors: (*Learning, Time studies), Analysis, Performance tests, Reaction (Psychology), Performance (Human), Training.

A 2-state relay control system in which S controls the position of a continually moving target with 2 response keys is employed to test the validity of concepts of hierarchical organization in skill development. As training progresses with this task Ss tend to develop strategies for improving their performance which imply control of the effect of an ongoing sequence of responses rather than execution of each response as a separate unit. Interresponse-time analysis reveals 2 distinctive modes of performance, designated the open-loop mode and the modulation mode, both of which imply higher-level control of the timing of response sequences but that achieve this control in 2 different ways. (Author)
AD-656 968 Not available from CFSTI.

UNDESIRABLE EFFECTS OF HYPNOSIS; THE DETERMINANTS AND MANAGEMENT,
Pennsylvania Hospital Philadelphia Unit for Experimental Psychiatry
Martin T. Orne. 24 Sep 63, 15p
AFOSR-67-1844
Contract Nonr-4731 (00), Grant AF-AFOSR-707-65
Prepared in cooperation with Pennsylvania Univ., Philadelphia.
Availability: Published in The International Journal of Clinical and Experimental Hypnosis v13 n4 p226-37 1965.

Descriptors: (*Hypnosis, Reaction (Psychology)), Effectiveness, Anxiety, Psychiatry, Hazards, Defense mechanisms (Psychology), Therapy, Abnormal psychology.

Various kinds of complications arising from the use of hypnosis are reviewed. The distinction is drawn between the induction of hypnosis when it is perceived as an episodic event, as in a laboratory context, versus the effect when it is perceived as leading to permanent changes, as in a therapeutic context. An attempt is made to draw these and other distinctions in order to understand better the possible sources of difficulties. (Author)
AD-656 970 Not available from CFSTI.

WHAT MUST A SATISFACTORY THEORY OF HYPNOSIS EXPLAIN,

Pennsylvania Hospital Philadelphia Unit for Experimental Psychiatry
Martin T. Orne. 1967, 9p
AFOSR-67-1852
Contract Nonr-3952 (00), Grant AF-AFOSR-707-65
Prepared in cooperation with Pennsylvania Univ., Philadelphia.
Availability: Published in International Journal of Psychiatry v3 n1/3 p206-11 Jan/Mar 1967.

Descriptors: (*Hypnosis, Theory), Reaction (Psychology), Motivation, Behavior, Performance (Human), Psychiatry, Personality.

Any theory of hypnosis must explain the kinds of changes that can be brought about and the ease with which this is accomplished. Further, it would be desirable to understand some of the reasons for differences of hypnotizability in the general population. Unfortunately, no theory has successfully addressed itself to these problems. (Author)
AD-656 972 Not available from CFSTI.

INTER-JUDGE RELIABILITY OF HUMAN FIGURE DRAWING MEASURES OF FIELD DEPENDENCE.
Pennsylvania Hospital Philadelphia Unit for Experimental Psychiatry
Frederick J. Evans, and Del Schmeidler. 13 Apr 66, 3p
AFOSR-67-1836
Grant AF-AFOSR-707-65
Prepared in cooperation with Pennsylvania Univ., Philadelphia.
Availability: Published in Perceptual Motor Skills v22 p630 1966.

Descriptors: (*Psychometrics, Reliability), Correlation techniques, Projective techniques.

Two raters scored two sets of a male and a female drawing obtained from 60 college students on the sophistication-of-body-articulation scale devised by Witkin as a measure of field dependence. The average Pearson correlation between raters for the four drawings from each S was .71. The correlation between the two judges was .75 and .79 for the two sets of drawings respectively. (Author)
AD-656 973 Not available from CFSTI.

TRANSFER OF VERBAL PAIRED ASSOCIATES,
Michigan Univ Ann Arbor Dept of Psychology
Edwin Martin. 13 Jul 64, 19p
AFOSR-67-1812
Contract AF 49 (638)-1235
Prepared in cooperation with Iowa Univ., Iowa City.
Availability: Published in Psychological Review v72 n5 p327-43 1965.

Descriptors: (*Word association, *Transfer of training), Learning, Verbal behavior, Reaction (Psychology).

From the current literature it is possible to identify 2 processes underlying the acquisition of verbal paired associates: response learning and association formation. It is also apparent from the literature that a complete treatment of association formation must take into account association directionality. Altogether, then, 3 'things' are seen to evolve during the acquisition of a paired-associate list: response availability, forward associations, and backward associations. The thesis of the present research is that which is transferred from the 1st and the 2nd task in a paired-associate transfer situation is some combination of these 3 effects. Utilizing the coordinate system invented by Osgood in which all the transfer paradigms can be arranged, 3 transfer surfaces are proposed which describe how each of the 3 effects is transferred individually. Applications to extant transfer literature are made. It is found that the principal results of nearly all experiments utilizing the A-B, C-D control paradigm can be accounted for. (Author)
AD-656 979 Not available from CFSTI.

PEASANT FATALISM AND SOCIOECONOMIC INNOVATION,
George Washington Univ Alexandria Va Human Resources Research Office
Arthur H. Niehoff, and J. Charnel Anderson. Jun 67, 15p Rept no. Professional Paper-33-67
Contract DA-44-188-ARO-2
Availability: Published in Human Organization v25 n4 p273-83 1966.

Descriptors: (*Leadership, Social sciences), (*Attitudes, Culture), Religion, Economics, Behavior, Social communication, Motivation, Agriculture, Water supplies, Education.

In the paper there is an examination of the nature of negativism in developing countries that resulted in the authors' isolation of three main types, which they labeled supernatural, situational, and project negativism. From the point of view of sociotechnical change, although all these forces are significant they do not constitute a critical influence nearly as often as do other characteristics of traditional society such as leadership patterns, social structure, and economic patterns. They are still less significant in the total change process than communication techniques, type of participation obtained, or degree of utilization of traditional culture. (Author)
AD-657 001 Not available from CFSTI.

THE THEORY AND AN EXPERIMENT ON A SIMPLE FUNGUS-EATER GAME,
California Univ Los Angeles Western Management Science Inst
Masanao Toda, and Hiroko Miyamae. Jun 67, 31p Rept no. WMSI Working Paper-121
Contract Nonr-233 (75)
Research supported in part by NSF.

Descriptors: (*Game theory, *Decision making), (*Behavior, Humans), Optimization, Fungi, Dynamic programming, Models (Simulations), Uranium, Predictions, Psychometrics.
Identifiers: Fungus-eater games.

The purpose of the fungus-eater approach is to obtain the optimal decision rules that handle means-end relations prescribed by a dynamic programming type situation to produce the maximum expected end-value. An experiment recently done at Hokkaido University is analyzed, and the behavior of human subjects is compared with the optimal behavior of the fungus-eater. Under the situations employed in the experiment, the fungus-eater model seems to work well for predicting the human SR behavior. (Author)
AD-657 058 HC$3.00 MF$0.65

OPERANT CONDITIONING OF GSR AMPLITUDE.
Technical rept.,
Indiana Univ Bloomington Dept of Psychology
J. E. Helmer, and John J. Furedy. Aug 67, 16p Rept no. TR-19
Contract Nonr-908 (15)

Descriptors: (*Conditioned reflex, *Galvanic skin response), Autonomic nervous system, Motivation, Reaction (Psychology), Psychophysiology, Responses.

An experimental group of 40 Ss was given a 5 cent-connected light as positive reinforcement contingent on their GSR amplitude following a lever press. A corresponding group of 40 control Ss had their reinforcement schedules yoked to that of their experimental partners. The Ss were told that reinforcement was dependent on the accuracy of their estimate of the conclusion of a 1-min. interval, as indicated by their lever press. Mean GSR amplitude following the lever press was significantly greater for the experimental (contingent reinforcement) Ss than for the non-contingent controls, indicating successful operant conditioning of a non-spontaneous autonomic response. (Author)
AD-657 173 HC$3.00 MF$0.65

TRANSFER OF TRAINING IN VERBAL LEARNING.
Final rept., 1 Jul 61-30 Jun 66,
California Univ Berkeley
Leo J. Postman. 30 Jun 66, 40p
Contract Nonr-222 (90)

Descriptors: (*Transfer of training, Verbal behavior), Learning, Word association, Recall, Performance (Human), Reaction (Psychology), Inhibition, Memory, Retention.

The series of studies took its point of departure from the assumption that in any given case general transfer represents circumscribed habits and skills which are determined by the conditions of training and which apply to a limited range of learning tasks. The experiments were, therefore, designed to determine the antecedents and the components of general transfer. The ultimate aim was to describe an hierarchy of skills which constitute potential components of general transfer.
AD-657 179 HC$3.00 MF$0.65

PERFORMANCE STUDIES ON THE NOTS-UCLA TRACKING SIMULATOR: AN INVESTIGATION OF OPERATOR PREDICTIVE BEHAVIOR ON TWO-DIMENSIONAL COMPENSATORY TRACKING.
California Univ Los Angeles Dept of Engineering
For primary bibliographic entry see Field 5H.
AD-657 182 HC$3.00 MF$0.65

THE TRACKING LOOP: A CRITICAL REVIEW OF TRACKING AND RELATED SENSORIMOTOR STUDIES.
California Univ Los Angeles Dept of Engineering
For primary bibliographic entry see Field 5H.
AD-657 183 HC$3.00 MF$0.65

PERFORMANCE STUDIES ON THE NOTS-UCLA TRACKING SIMULATOR: FINAL REPORT.
California Univ Los Angeles Dept of Engineering
For primary bibliographic entry see Field 5H.
AD-657 184 HC$3.00 MF$0.65

STIMULUS PRE-DIFFERENTIATION AS A FACTOR IN TRANSFER OF TRAINING.
Connecticut Coll New London
For primary bibliographic entry see Field 5E.
AD-657 191 HC$3.00 MF$0.65

STUDIES IN COMPLEX COORDINATION. I. PERFORMANCE ON THE TWO-HAND COORDINATOR AS A FUNCTION OF THE PLANES OF OPERATION OF THE CONTROLS.
Rochester Univ N Y Dept of Psychology
For primary bibliographic entry see Field 5E.
AD-657 192 HC$3.00 MF$0.65

SUGGESTIONS CONCERNING DESIRABLE DISPLAY CHARACTERISTICS FOR AIRCRAFT INSTRUMENTS.
Emmanuel Coll Boston Mass Oriental Science Library
For primary bibliographic entry see Field 5E.
AD-657 194 HC$3.00 MF$0.65

COMMUNICATION IMPACT: A CONCEPTUAL MODEL ANALYSIS OF INDIVIDUAL PREDISPOSITIONS AND THE ANALYSIS OF THE IMPACT OF A COUNTY CIVIL DEFENSE EDUCATIONAL PROGRAM.

Iowa State Univ Ames Dept of Sociology and Anthropology
For primary bibliographic entry see Field 15E.
AD-657 217 HC$3.00 MF$0.65

ACTIVATION AND LONG TERM PERFORMANCE,
Antioch Coll Yellow Springs Ohio Behavior Research Lab
H. J. Jerison. 1967, 19p
AFOSR-67-1941
Contract AF 33 (615)-1086, Grant AF-AFOSR-150-66
Availability: Published in Acta Psychologica v27 p373-89 1967.

Descriptors: (*Attention, Performance tests), Animals, Humans, Behavior, Performance (Human), Stimulation, Sensory perception, Thresholds (Physiology), Learning, Conditioned reflex.

Is activation theory useful or necessary for the analysis of long term performance on perceptual tasks. After criticizing the theory for being too broad and nonspecific, because even contradictory results would not embarass it, this report illustrates the problem with data on human and animal vigilance. It is concluded that activation theory in several forms may be necessary to understand different phases of vigilence performance. The questions relevant for activation theory include the probable inhibition of observing behavior when an overload is established by eliciting observing at a high rate, the temporal conditioning of levels of arousal, and motor aspects of the emission of detection-indicating responses. (Author)
AD-657 239 Not available from CFSTI.

AUDITORY DIRECTION AND HEAD ROTATION,
Bryn Mawr Coll Pa
Elizabeth Taylor Karrer, and Robert S. Davidson. 5 May 67, 4p
AFOSR-67-1919
Grant AF-AFOSR-109-63
Availability: Published in Perceptual and Motor Skills v24 p961-2 1967.

Descriptors: (*Auditory signals, *Direction finding), Head, Rotation, Auditory perception, Errors.

When the head is turned to the right or left there is a constant error in judgments of the direction of a sound, an effect similar to the visual A-effect with head tilt. (Author)
AD-657 241 Not available from CFSTI.

THE CHINESE COMMUNIST POLITBURO AND ITS OPERATIONAL CODE: A FEASIBILITY STUDY.
Part I of final rept.,
Stanford Univ Calif
Robert C. North. 18 Aug 67, 274p
Contract N00014-67-A-0112-0005
Rept. on proj. Studies on Selected Aspects of International Behavior.

Descriptors: (*Communists, China), (*Leadership, *Decision making), Social sciences, Communism, Literature, Culture, Interactions, Behavior, Perception (Psychology), Feedback, Propaganda, Reaction (Psychology), Feasibility studies, Operations research, Political science, Foreign policy, Predictions, Probability.

Part I of this report is derived largely from discussions which emerged from a conference of China specialists held at Stanford University December 16, 17 and 18 1967 and focussed upon the operational code concept and upon the difficulties and feasibilities inherent in it. Part I also draws upon pertinent articles from recent periodical literature and upon brief memoranda prepared for this report by scholars who do not in all instances consider themselves as China specialists, but who have an interest in the problems of Chinese decision-making and policy, combined with knowledge and skills that seem highly relevant to the issues under discussion. Part II presents a unified model for studying the Chinese operational code and a variety of phenomena bearing on it. This section draws upon papers and memoranda prepared specifically for the operational code inquiry, and also from a wide range of social science literature. Part III describes a number of research techniques, and Part IV puts forward research recommendations and priorities. Part V consists of appendices. Included therein are some of the papers prepared for the conference.
AD-657 249 HC$3.00 MF$0.65

THE CONSTANT ERROR IN AMPLITUDE DISCRIMINATION AND THE INTER-STIMULUS INTERVAL: A RE-EXAMINATION.
Technical rept.,
Washington Univ Seattle Psychophysics Lab
Don A. Ronken. 29 May 67, 94p Rept no. PRP-35N
Contract Nonr-477 (34)

Descriptors: (*Psychometrics, Errors), Psychophysics, Analysis of variance, Reaction (Psychology), Time, Experimental design, Decision making, Performance (Human).

The 'constant error' or 'time error' observed in psychophysical discrimination experiments has been a source for conjectures about the judgment process, the suggestion being that the nature of the errors indicates something significant about the underlying decision mechanism. The classical experiment for this purpose shows how the constant error or response bias changes as the inter-stimulus interval varies. This relationship is examined for the case of amplitude discrimination by using an XAB paradigm which switches between several amplitude levels randomly from trial to trial. Data from three very experienced observers indicate that with this procedure, variations in the inter-stimulus interval do not affect the response bias, but the discriminability decreases regularly with increasing intervals. A signal detection-type model is developed for the experiment which is used to describe two alternative interpretations for the effect of the inter-stimulus interval. The first interpretation follows the classical 'fading trace' notion, while the second postulates a random walk for the psychological representation of stimulus X. It is shown that neither hypothesis alone is sufficient to account for the discriminability changes that occur with the inter-stimulus interval; effects characteristic to each interpretation appear in the data. (Author)
AD-657 263 HC$3.00 MF$0.65

SYSTEMATIC BIASES IN EYE MOVEMENT LATENCY DATA,
Washington Univ Seattle Psychophysics Lab
M. G. Saslow, and C. A. Saslow. 1967, 9p Rept no. PRP-27N
Contract Nonr-477 (34)

Descriptors: (*Vision, *Psychometrics), (*Eye, Motion), Psychophysics, Responses, Visual signals, Psychophysiology, Statistical analysis, Experimental data, Decision making.

The investigation was designed to estimate systematic time trends over sets of hundreds of trials, and to suggest methods for their compensation, in the study of human lateral saccadic eye movements. A disjunctive latency paradigm, with four mutually exclusive lateral displacements from a central fixation point, was in use in order to combat time estimation biases often found in simple latency paradigms. (Author)
AD-657 297 HC$3.00 MF$0.65

EFFECTS OF COMPONENTS OF DISPLACEMENT STEP STIMULI UPON LATENCY FOR SACCADIC EYE MOVEMENT.
Technical rept.,
Washington Univ Seattle Psychophysics Lab
M. G. Saslow. 1 Sep 66, 25p Rept no. PRP-28N
Contract Nonr-477 (34)

Descriptors: (*Visual perception, *Psychometrics), (*Eye, Motion), Time, Visual signals, Decision making, Stimulation, Accuracy, Psychophysics.

The standard displacement step stimulus often used to produce lateral saccadic eye movements is considered in terms of the effects of its components: termination of stimulation at an initial fixation point, and onset of stimulation at a new, laterally displaced fixation point. If the termination and onset are simultaneous, saccade latency is about 200. msec. If there is a gap of 200. msec. or more between these events, latency decreases to about 150. msec. If the termination follows the onset by 100. msec. or more, latency increases to about 250. msec. (Author)
AD-657 299 HC$3.00 MF$0.65

LATENCY FOR SACCADIC EYE MOVEMENT,
Washington Univ Seattle Psychophysics Lab
M. G. Saslow. 1 Oct 66, 17p Rept no. PRP-29N
Contract Nonr-477 (34)

Descriptors: (*Visual perception, *Psychometrics), (*Eye, Motion), Visual signals, Time, Decision making, Reaction (Psychology), Psychophysics, Factor analysis.

Under carefully controlled conditions, in blocks of trials in which the stimulus displacement on any given trial is randomly selected from a group of two, four, or eight possible displacements, latency for lateral saccadic eye movement does not change. Moreover, a subject trained on such a disjunctive latency task, then presented with blocks of trials in which there is only one possible stimulus displacement, of probability 1.00, 0.75, 0.50, or 0.25, displays the same latency to that displacement as when it was embedded in one of the disjunctive sets. These results conflict with earlier assertions that knowledge of stimulus location determines saccade latency. When the saccade on each trial is under the control of the stimulus on that trial, the size of the set of possible stimulus displacements does not affect latency to a particular displacement. These results also suggest that previous estimates of saccade latency using single stimulus displacements were underestimates, because subjects were not previously trained to follow stimulus displacement in a disjunctive task. A certain amount of care is required if saccade latencies are to be attributed completely to control by stimulus factors. (Author)
AD-657 300 HC$3.00 MF$0.65

AN EXPERIMENTAL CRITIQUE OF THE METHOD OF CONSTANT STIMULI AND SOME ALTERNATIVE PROCEDURES.
Technical rept.,
Washington Univ Seattle Psychophysics Lab
Don A. Ronken. 15 Apr 67, 44p Rept no. PRP-31N
Contract Nonr-477 (34)

Descriptors: (*Visual perception, *Psychometrics), Errors, Experimental data, Visual signals, Reaction (Psychology), Experimental design, Psychophysics.

Some experiments investigating the constant error demonstrate that the method of constant stimuli is especially unsuited for studying such small effects of discrimination. The nature of the confounded data from the classical procedure suggests that the difficulty is of a fundamental nature and can be expected to influence the data under less stringent conditions as well. Some data from the literature are offered to support this view. Several alternative procedures are developed and evaluat-

ed experimentally, the most promising of which is shown to be a form of the XAB method. (Author)
AD-657 301 HC$3.00 MF$0.65

OPERANT CONTROL OF RESPONSE LATENCY IN MONKEY: PERIPHERAL VS CENTRAL EXPLANATIONS.
Technical rept.,
Washington Univ Seattle Psychophysics Lab
Carol A. Saslow. 7 Apr 67, 26p Rept no. PRP-32N
Contract Nonr-477 (34)

Descriptors: (*Reaction (Psychology), Training), (*Reflexes, Control), Psychometrics, Monkeys, Auditory signals, Psychophysics.

Two monkeys were trained to press a telegraph key in response to a tone and release it quickly to a subsequent light or click stimulus occurring after a variable interval. After training with a self-adjusting limited hold, 'minimum' reaction time to click was 160 msec. and to light about 200. Temporal contingencies or 'payoff bands' were then introduced which reinforced only latencies falling between two limits 50 msec. apart. Feedback was given as to whether the response latencies were too slow, on target, or too fast relative to the payoff band. A trained animal could precisely center his latency distribution on any 50-msec.-wide payoff band located from 200 to 600 msec. after the stimulus, with from 60 to 80% of his response latencies achieving reinforcement. Distribution statistics were comparable to those of trained human subjects. Because such precise timing might be accomplished by peripheral adjustment such as changing manner of holding key, latency of EMG activation was measured in participating arm muscles. EMG activation preceded key release by a constant interval, regardless of response latency, indicating a more central mechanism for timing of brief intervals. (Author)
AD-657 302 HC$3.00 MF$0.65

SCALING EXTRAVEHICULAR AND EN ROUTE JUDGMENTS OF AUTOMOBILE SPEED.
Technical rept.,
Washington Univ Seattle Psychophysics Lab
George Semb. 1967, 37p Rept no. PRP-33A
Contracts Nonr-477 (34), DA-49-193-MD-2713

Descriptors: (*Visual perception, *Psychometrics), (*Vehicles, *Velocity), Psychophysics, Errors, Roads, Motion, Acceleration, Deceleration, Measurement, Least squares method, Statistical analysis.

Automobiles were used to investigate psychophysical laws which govern judgments of three forms of subjective speed: linear speed; approach speed; and en route speed. By the method of magnitude estimation, subjective values of all three were found to be power functions of their corresponding physical velocities with exponents of 1.00, 1.75, and 1.94. The relation between category and magnitude scales of en route speed was also studied. Characteristic of prothetic continua, the category scales are concave downward when plotted as a function of the magnitude scales. In order to determine the descriptive value of Weber's Law for en route velocity, several difference thresholds were taken at velocities from 20 to 60 miles per hour. The results show that Weber's fraction, delta I/I, is constant over this range. (Author)
AD-657 303 HC$3.00 MF$0.65

REPORT OF PROGRESS NO. 5,
Washington Univ Seattle Psychophysics Lab
Eugene Galanter. 1 Jun 67, 18p Rept no. PRP-34NA
Contracts DA-49-193-MD-2713, Nonr-477 (34)
See also AD-638 628.

Descriptors: (*Psychophysiology, Reviews), Visual perception, Auditory perception, Memory, Psychophysics, Reaction (Psychology), Reflexes.

Progress is reviewed on problems of visual and auditory perception, memory, animal psychophysics, and human and animal reaction time.
AD-657 305 HC$3.00 MF$0.65

VISUAL DISCRIMINATIONS OF A SUBJECT WITH ACQUIRED UNILATERAL TRITANOPIA.
Columbia Univ New York Dept of Psychology
For primary bibliographic entry see Field 6E.
AD-657 310 Not available from CFSTI.

MONOCULAR BRIGHTNESS AND FECHNER'S PARADOX,
Washington Univ Seattle Psychophysics Lab
Davida Y. Teller, and Eugene Galanter. 31 Oct 66, 18p Rept no. PRP-30A
Contract DA-49-193-MD-2713

Descriptors: (*Brightness, *Visual perception), Targets, Vision, Adaptation (Physiology), Visual signals.

Monocular brightness were varied without varying monocular luminances, both by means of simultaneous contrast and by means of changes in the level of dark adaptation. Binocular brightness was shown to change in accord with monocular brightness changes. (Author)
AD-657 331 HC$3.00 MF$0.65

FURTHER RESEARCH WITH ADAPTIVE TASKS.
Final rept.,
Dunlap and Associates Inc Santa Monica Calif Western Div
Charles R. Kelley. 15 Aug 67, 101p
Contract Nonr-4986 (00)

Descriptors: (*Tracking, Adaptive systems), (*Performance (Human), Tracking), Operators (Personnel), Psychometrics, Frequency, Statistical analysis.

The report consists of a review of project activities and three technical papers. 'The Measurement of Tracking Proficiency' reviews in depth the problem of assessing tracking proficiency, and presents 17 equations used for the purpose. The advantages of adaptive techniques are presented in the context of other available methods for measuring tracking performance. 'Frequency Adaptive Tracking' describes the development and two applications of a system for adjusting all the frequencies in a forcing function simultaneously. Human operator data and a special preview display using the system are presented. 'Research Applications of Adaptive Tasks' show how adaptive techniques can be used in research to establish new dependent variables for study. Equations and example data for tracking and for tasks discontinuous in time are presented. (Author)
AD-657 343 HC$3.00 MF$0.65

CONCEPTUAL STRUCTURE AND GROUP PROCESSES IN AN INTER-NATION SIMULATION. PART I. THE PERCEPTION OF SIMULATED NATIONS,
Educational Testing Service Princeton N J
Michael J. Driver. Apr 62, 372p Rept no. RB-62-15
Grant PHS-M-4186
Prepared in cooperation with Princeton Univ., N. J., Contract Nonr-1858 (12), Proj. NR-171-055, Rept. no. 9, and Northwestern Univ., Evanston, Contract AF 49 (638)-742.

Descriptors: (*Perception (Psychology), *Group dynamics), (*Social psychology, Simulation), Stress (Psychology), Decision making, Environment, Determinants, Selection, Psychometrics, Accuracy.

The purposes of the study were to uncover the general structure of the concept used to perceive social groups acting as simulated nations, to determine whether the complexity and content of this perceptual concept would shift under varying situational stresses and to discover whether differences in the complexity of this specific concept could be traced to a measure of generalized cognitive complexity. The theory advanced was that complexity would relate to stress in a curvilinear fashion. Moderate stress should induce greater complexity in social perception than either too mild or too intense stress. In addition it was expected that at most stress levels differences in complexity can be related to differences in the characteristic levels of cognitive complexity in perceivers. In order to examine these points, the complexity of the social group concept as it functioned in the Internation Simulation was studied. The simulation allowed seven, three-man nations to operate in a complex decision making environment for four days. In 10 different runs of the simulation, one half of the nations were manned by persons of high generalized complexity, while half were staffed with more generally simple persons. Generalized complexity was measured with the Situational Interpretation Test. Four runs involved the intense stress of war, four peace runs were of moderate stress and two peace runs were classed as mild stress. In general the study found that by multidimensional scaling meaningful dimensions in the concept employed to perceive simulated nations could be discovered. (Author)
AD-657 350 HC$3.00 MF$0.65

TRAINING, TASKS AND MEDIATOR ORIENTATION IN HETEROCULTURAL NEGOTIATIONS.
Technical rept.,
Illinois Univ Urbana Group Effectiveness Research Lab
E. S. K. Nayar, Hubert Touzard, and David A. Summers. May 67, 28p Rept no. TR-54
Contract Nonr-1834 (36), ARPA Order-454

Descriptors: (*Social communication, *Culture), (*Training, Social communication), Effectiveness, Leadership.

The study investigated the effects of cultural training, mediator orientation, and task characteristics upon heterocultural negotiation. Specifically, Indian and American Ss negotiated child-rearing issues under 3 American training conditions (culture assimilator vs. traditional vs. irrelevant training), 3 mediator conditions (high vs. moderate vs. low LPC), and 2 task conditions (formal vs. informal negotiations). Results from 36 teams consisting of one American negotiator, one Indian negotiator and an American mediator suggest the following: (a) intragroup relations are facilitated when one member of the negotiation group has received cultural training, and that programmed (assimilator) training is more effective than traditional essay training; (b) intragroup relations are facilitated if the negotiators are not required to defend positions formally assigned to them, but are free to interact without such formal restraints; and (c) when the task is formal, the negotiators are most effective if the mediator is oriented towards maintaining harmonious relations between the negotiators (high LPC). If the negotiation situation is informal, the negotiators are most effective if the mediator tends to be more task-oriented (low LPC). (Author)
AD-657 353 HC$3.00 MF$0.65

THE HORIZONTAL-VERTICAL ILLUSION IN PLANE GEOMETRIC FIGURES,
Johns Hopkins Univ Baltimore Md Psychological Lab
R. B. Sleight, and T. R. Austin. 10 Oct 51, 20p
SPECDEVCEN-166-1-144
Contract N5ori-166 (01)

Descriptors: (*Illusions, Geometric forms), Performance tests, Visual perception.

The purpose of the experiment was to determine whether the classical statement of the horizontal-vertical illusion (which states that the vertical dimension is seen as perceptually longer than the horizontal dimension) is descriptive of judgments of plane geometric figures. The results did not wholly agree with the classical statement of the horizontal-vertical illusion. The data from the square-rectangle series suggest the operation of two distinct differential effects. First, it would seem that while the classical illusion exists in some figures, a nonclassical, or even no illusion, exists in other figures, and, therefore, the classical statement which says that the vertical dimension is perceptually lengthened does not hold, arbitrarily, for all figures. Each individual figure must be studied before any definite statement can be made about the illusory effects of that figure. Secondly, there is a difference in subjects as to whether they see the illusion or not. A square, for example, consistently looks like a vertical rectangle to some subjects and appears as a horizontal rectangle to others. (Author)
AD-657 369 HC$3.00 MF$0.65

THE EFFECT OF DIFFERENTIAL REINFORCEMENT ON THE DISCRIMINATION OF VISUAL NUMBER,
Mount Holyoke Coll South Hadley Mass Psychophysical Research Unit
A. L. Minturn, and T. W. Reese. 22 Dec 50, 32p
SPECDEVCEN-131-1-8
Contracts N5ori-166 (01), Nonr-131 (01)
Availability: Published in The Journal of Psychology v31 p201-31 1951.

Descriptors: (*Visual perception, *Numbers), Errors, Accuracy, Decision making, Training, Performance (Human), Psychophysics, Counting methods.

A study was made on the way people judge number and the effect of a simple training procedure on this kind of judgment. Previous experiments have shown that when a person does not have time enough to count, his estimate of the number of objects is not accurate for numbers greater than 5. Judgments become less and less accurate as the number of objects increases. The experiment was designed to determine whether telling the subjects the correct number of dots on a screen would bring about a sudden or a gradual improvement in their reports, and whether their reports would continue to improve with continued training. The long term effects of this initial training were also investigated.
AD-657 402 Not available from CFSTI.

INFLECTION OF REPEATED MESSAGES,
Kenyon Coll Gambier Ohio
For primary bibliographic entry see Field 20A.
AD-657 422 Not available from CFSTI.

PURDUE SPEECH SOUND TIMER.
Purdue Univ Lafayette Ind
For primary bibliographic entry see Field 17B.
AD-657 468 HC$3.00 MF$0.65

OBEDIENCE TO ROTATION-INDICATING VISUAL DISPLAYS AS A FUNCTION OF CONFIDENCE IN THE DISPLAYS.
Technical rept.,
Illinois Univ Urbana Dept of Psychology
Beatrice E. Johnson, and A. C. Williams, Jr. Jun 49, 19p
SPECDEVCEN-71-16-2
Contract N6ori-71 (16)

Descriptors: (*Display systems, *Attitudes), (*Visual perception, Display systems), Rotation, Illusions, Motivation.
Identifiers: Confidence (Psychology).

The experiment was constructed to determine the effects of different degrees of confidence in visually presented information upon the obedience with which subjects respond to the indications of a variety of rotation indicating displays.
AD-657 472 HC$3.00 MF$0.65

EVALUATION OF THE SCHOOL LINK AS AN AID IN TEACHING GROUND REFERENCE MANEUVERS.
Technical rept.,
Illinois Univ Urbana Dept of Psychology
Edward L. Brown, William G. Matheny, and Ralph E. Flexman. Dec 50, 36p
SPECDEVCEN-71-16-7
Contract N6ori-71 (16)
Report on project Human Engineering Systems Studies.

Descriptors: (*Training devices, Flight), (*Performance (Human), *Flight), Training, Aircraft, Landings, Pilots, Altitude, Errors, Tests.

The study was designed to determine what problems are involved in teaching certain ground reference flight maneuvers in the School Link flight trainer and to evaluate the effects of such training upon the performance of student pilots in light aircraft. The ground reference maneuvers studied were normal landings, forced landings, and pylon eights. Two problems were clearly indicated by this experiment: the need for more reliable methods of recording performance in both the aircraft and the Link trainer, and the need for matching closely the subjects assigned to the experimental group receiving Link training and the control group not receiving such training. Recommendations are made for the design of further experiments on training in the area of ground reference flight maneuvers. Instructional techniques for utilizing synthetic contact flight trainers, methods of equating groups, methods of recording performance in the aircraft, and the importance of determining the reliability of the performance record are presented and discussed. (Author)
AD-657 473 HC$3.00 MF$0.65

ACCURACY OF TACTUAL DISCRIMINATION OF LETTERS, NUMERALS, AND GEOMETRIC FORMS.
Provisional rept.,
Johns Hopkins Univ Baltimore Md Psychological Lab
T. R. Austin, and R. B. Sleight. 7 Dec 51, 23p
SPECDEVCEN-166-1-146
Contract N5ori-166 (01)

Descriptors: (*Sensory perception, Accuracy), Touch, Numbers, Geometric forms, Performance (Human).

The purpose of this experiment was to determine to what extent various letters, numerals, and geometric forms could be discriminated tactually with the index finger-tip. Two sets of stimulus figures were tested, one set of solid figures and one set which contained figures made up of points. Both sets included all the letters in the alphabet, the numerals 2 through 9, and various geometric forms. The stimulus figures were presented one at a time in random sequence to ten subjects. The experiment involved four conditions of presentation of the stimulus figures: (1) solid figures--no finger-tip movement permitted, (2) solid figures-movement, (3) point figures--no movement, and (4) point figures-movement. Of the four conditions tested, the solid figures-movement condition proved to be the most effective. Under the restrictions of this condition, approximately 60 per cent of the figures were discriminable at or above the 90 per cent level of accuracy, i.e., not more than one error from a total of ten subjects on each of the figures. These figures were the following: C, D, E, G, I, J, K, L, O, P, Q, T, U, V, W, X, Y, 2, 7, 9, diamond, right triangle, rectangle, crescent and half circle. No errors were made on the I or L throughout the experiment regardless of mode of presentation, and the C, I, L, O, T, and U met the 90 per cent accuracy criterion in each of the four conditions. Possible applications of tactual cues are suggested and three criteria for selecting the most effective figures are discussed. (Author)
AD-657 476 HC$3.00 MF$0.65

THE EFFECT OF AMBIENT AND BODY TEMPERATURES UPON REACTION TIME,
Psychological Corp New York
George Forlano. 15 Mar 48, 35p
SPECDEVCEN-151-1-13
Contract N6ori-151 (01)

Descriptors: (*Reaction (Psychology), Reflexes), (*Body temperature, Motor reactions), Performance (Human), Tolerances (Physiology), Cooling, Heat tolerance, Diurnal variations, Humidity, Protective clothing, Exposure, Reviews.

Studies of reaction time are reported for temperatures from -50 degrees to +117 degrees F. The following conclusions apply to simple discrimination and to choice reaction times within the range of conditions examined. The conclusions should not be applied to speed of other performances. (a) Reaction time does not vary significantly with low ambient temperatures provided the body generally and the responding member in particular are properly protected. (b) During exposures for several days to temperatures as low as -20 degrees F, clothing can adequately protect the body without interfering significantly with the speed of the simple reaction. (c) For periods of about an hour, current-type clothing affords adequate protection against ambient temperatures as low as -50 degrees F. (d) Conditions which may reduce strength and dexterity of movement may leave reaction time unchanged. (e) Reaction time does not vary significantly with high ambient temperatures up to +117 degrees F provided the wet bulb temperature does not exceed about 86 degrees F. (Author)
AD-657 481 HC$3.00 MF$0.65

THE EFFECT OF HEAT UPON THE PERFORMANCE OF MEN IN HIGH SPEED AIRCRAFT: A CRITICAL REVIEW,
Psychological Corp New York
Lois Connell. 30 Jun 48, 111p
SPECDEVCEN-151-1-17
Contract N6ori-151 (01)

Descriptors: (*Performance (Human), *Heat), (*Aircraft, Performance (Human)), Tolerances (Physiology), Velocity, Thermal stresses, Anoxia, Behavior, Atmosphere, Solar radiation, Jet planes, Pressurization, Equilibrium, Skin, Deterioration, Environmental tests.

The effect of high temperature upon human performance is examined by means of a review and evaluation of the relevant literature. High temperature will be a problem for airplanes that fly at high speed. The sources of heat are friction of the aircraft skin with the air, cabin pressurization, waste heat from the power plant and other equipment, solar radiation, and possibly heat from the atmosphere itself. Standard procedures should be established for specifying the physiological, environmental, and psychological variables which are being studied. (Author)
AD-657 482 HC$3.00 MF$0.65

A MODIFICATION OF THE HOFFMAN-FLESHLER GRID SHOCK SCRAMBLER,
Antioch Coll Yellow Springs Ohio
For primary bibliographic entry see Field 14B.
AD-657 483 Not available from CFSTI.

PATTERNS OF EXTINCTION OF A DETECTION-INDICATING RESPONSE UNDER ESCAPE-AVOIDANCE REINFORCEMENT,

Antioch Coll Yellow Springs Ohio Behavior Research Lab
Harry J. Jerison. 1966, 4p
AFOSR-67-1951
Grant AF-AFOSR-150-66
Availability: Published in Psychon Sci v5 n7 p279-80 1966.

Descriptors: (*Attention, Conditioned reflex), Behavior, Responses, Reaction (Psychology), Learning, Rats.

Rats conditioned to avoid .40 mA shock achieved asymptotic performance at about 80 per cent avoidance. Reducing shock to .25 mA resulted in a drop to about 60 per cent. Under .40 and .25 mA, essentially all unavoided shocks were terminated by an escape response. Reducing the shock from .40 to .10 mA resulted in rapid and complete extinction of both the avoidance and the escape response. (Author)
AD-657 484 Not available from CFSTI.

CONTINUOUS VERSUS TERMINAL VISUAL FEEDBACK IN PRISM AFTEREFFECTS.
Phase rept.,
Naval Air Development Center Johnsville Pa Aerospace Crew Equipment Dept
Malcolm M. Cohen. 8 Jun 67, 14p Rept no. NADC-AC-6707
Availability: Published in Perceptual and Motor Skills v24 p1295-302 1967.

Descriptors: (*Space perception, Motor reactions), (*Motor reactions, Adjustment (Psychology)), Feedback, Errors, Prisms (Optics), Vision, Hands, Visual signals.

Subjects wore prisms as they reached for a visible target with one hand. When the reaching hand was viewed continuously, aftereffects were restricted to that hand. When the reaching hand was viewed only after each reaching movement had already been completed, aftereffects were obtained with both hands. These findings dispute the generality of assertions that the aftereffects of wearing prisms are exclusively a result of either changes in the sensed position of the prismatically viewed arm or changes in the judgment of the direction of the gaze. Rather, both appear to be possible mechanisms underlying the aftereffects, and their relative prominence depends strongly upon visual feedback conditions. (Author)
AD-657 492 Not available from CFSTI.

EEG CHANGES IN PERCEPTUAL AND SENSORY DEPRIVATION,
Manitoba Univ Winnipeg
For primary bibliographic entry see Field 6P.
AD-657 505 Not available from CFSTI.

PERCEPTUAL DEPRIVATION PHENOMENA: ROLE OF THE RECUMBENT POSITION,
Manitoba Univ Winnipeg
John P. Zubek, and M. MacNeill. 28 Dec 65, 5p
Grants DRB-9425-08, NIH-MH-08748-01
Availability: Published in Journal of Abnormal Psychology v72 n2 p147-50 1967.

Descriptors: (*Confinement (Psychology), Reaction (Psychology)), Questionnaires, Relaxation (Physiology), Illusions, Fear, Anxiety, Appetite, Sensory perception, Abnormal psychology.

A questionnaire, appraising 22 different content areas, was administered to 3 groups of Ss, i.e., ambulatory controls, recumbent controls, and a group who endured 1 wk. of perceptual deprivation. A total of 54 Ss was used, 18 in each of the 3 groups. The findings indicated that many of the dramatic subjective phenomena, previously reported in the isolation literature, resulted solely from perceptual isolation. Among these are hallucinatory-like experiences, changes in body-image, loss of contact with reality, temporal disorientation, and speech difficulties. Other symptoms appeared to bee due to the combined effects of perceptual isolation and recumbency. Changes in only 4 of the 22 content areas were due to the recumbent position alone, i.e., complex and vivid dreams, worry and fright, hunger, and subjective restlessness. (Author)
AD-657 509 Not available from CFSTI.

QUANTIFICATION OF SHARED CAPACITY PROCESSING IN AUDITORY AND VISUAL DISCRIMINATION.
Research paper,
Defence Research Medical Labs Toronto (Ontario)
M. M. Taylor, P. H. Lindsay, and S. M. Forbes. 1967, 7p Rept no. DRML-RP-656
Availability: Published in Acta Psychologica v27 p223-9 1967.

Descriptors: (*Sensory perception, Performance (Human)), Auditory perception, Visual perception, Reaction (Psychology).

When two or more discriminations are processed together, either they proceed in parallel with the same efficiency as when either is processed alone, or they may interfere with one another, and share the total available processing capability. Quantification of the capacity devoted to discrimination in the shared condition is possible using the additive properties of d prime sq deduced in this paper as a measure of discriminative performance. The total amount of processor capacity used for all discriminations in a shared process has been found to be approximately 85% of that used for any single discrimination performed alone. This proportion holds whether two auditory, two visual, one auditory and one visual, or two auditory and two visual discriminations are simultaneously attempted. The implication is that the discrimination processor has a finite capacity which may be deployed on either auditory or visual tasks, and that 15% of this capacity is required to control the sharing procedure. (Author)
AD-657 510 Not available from CFSTI.

ACCURACY OF VISUAL INTERPOLATION BETWEEN CIRCULAR SCALE MARKERS AS A FUNCTION OF THE SEPARATION BETWEEN MARKERS,
Johns Hopkins Univ Baltimore Md
M. Leyzorek. 1949, 10p
SPECDEVCEN-166-1-52
Contract N5ori-166 (01)
Availability: Published in Journal of Experimental Psychology v39 n2 p270-9 Apr 1949.

Descriptors: (*Visual acuity, Interpolation), (*Instrument dials, Reading), Scale, Accuracy, Separation, Human engineering, Visual perception.

The accuracy of visual interpolation between the circular scale markers of a polar coordinate plot was studied as a function of the size of the scale interval. The interval sizes studied were 1/8 in., 1/2 in., 1 in., 2 in., 4 in., 5 in., 6 in., 8 in., and 10 in. The first seven of these scales were studied on a 10 in. diameter display while the latter seven (including duplications of the 1 in., 2 in., 4 in., and 5 in. scales) were tested on a display 20 in. in diameter. The principal finding of the study is that the errors of interpolation (expressed as proportions of the intervals in which the estimations are made) are large for scale intervals 1/8 in. in size (18 percent), and decrease rapidly as the scale interval increases in size up to 1/2 in. (4 per cent). Increases in the size of the scale interval beyond 1/2 in. do not further reduce errors of estimation. Expressed as absolute errors of estimation in millimeters, the errors of localization are constant for the three smallest scale intervals tested (1/8 in., 1/4 in., 1/2 in.) and increase linearly thereafter for larger scale units. For the larger scale units the Weber fraction is a constant. Individuals differ significantly in their ability to perform this kind of visual interpolation. (Author)
AD-657 516 Not available from CFSTI.

REACTION TIME AS A MEASURE OF SPAN OF ATTENTION,
Johns Hopkins Univ Baltimore Md Dept of Psychology
I. J. Saltzman, and W. R. Garni. 3 Nov 47, 15p
SPECDEVCEN-166-1-31
Contract N5ori-166 (01)
Availability: Published in Journal of Psychology v25 p227-41 1948.

Descriptors: (*Reaction (Psychology), Reflexes), (*Attention, Psychometrics), Reliability, Perception (Psychology), Identification, Accuracy.

The conclusions drawn from these experiments are as follows: (1) A reaction-time technique is not only feasible, but is to be preferred over a tachistoscopic technique for obtaining data on span. The reaction time data clearly distinguish between different stimulus conditions, as well as between different numbers of objects. (2) Adequate measures of reaction time can be obtained more quickly than adequate tachistoscopic measures. The reason for this is that reaction time measures are more reliable and, therefore, fewer measurements have to be made. Also their use avoids the necessity of obtaining complete psychometric functions for each exposure duration. (3) The reaction time procedure is not affected by the observer's knowledge of the range of stimulus number. (4) The shape of the reaction time curves makes it clear that there is no such event as an immediate awareness of number. It takes longer to correctly identify three objects, than two, etc. (5) When stimulus conditions are altered, the direct consequence is a change in the reaction time for correct identification of all numbers of objects. Span-size changes are an artifact of the method of measurement. (Author)
AD-657 518 Not available from CFSTI.

PITCH CHARACTERISTICS OF SHORT TONES. II. PITCH AS A FUNCTION OF TONAL DURATION,
Johns Hopkins Univ Baltimore Md
J. M. Doughty, and W. R. Garner. 1948, 18p
SPECDEVCEN-166-1-48
Contract N5ori-166 (01)
Availability: Published in Journal of Experimental Psychology v38 n4 p478-94 Aug 1948.

Descriptors: (*Sound pitch, *Auditory perception), (*Psychometrics, Sound pitch), Intensity, Sensitivity, Time, Ear, Frequency, Errors, Tests.

In the first experiment of the series our interest lay in determining the shortest duration at which tones of various frequencies still had some pitch character to them. We determined two duration thresholds for pitch, representing the limits of pitch change from a 'click-pitch' to 'tone-pitch.' The 'click-pitch' threshold was the shortest duration at which a click was heard with pitch in it, and the 'tone-pitch' threshold was the point at which the sound became a tone and the pitch character changed little or not at all with further increases in duration. It was concluded that the 'click-pitch' threshold represented the shortest duration with which the ear can be stimulated in order for some pitch identification to be possible and the 'tone-pitch' threshold represented the shortest duration at which reasonably good pitch discrimination should be present. Having established that pitch is present even in extremely short tones (on the order of four msec. for the middle range of frequencies and 11 msec. for low frequencies around 250 cps), the next step was to investigate whether or not the pitch of a tone changes as its duration is shortened. Pitch discrimination becomes increasingly less accurate as the duration of a tone is shortened. Less certain, however, is the direction and the magnitude of the pitch change as a function of duration. (Author)
AD-657 521 Not available from CFSTI.

SOME EFFECTS OF INTERAURAL PHASE DIFFERENCES ON THE PERCEPTION OF PURE TONES,

Johns Hopkins Univ Baltimore Md Psychological Lab
For primary bibliographic entry see Field 20A.
AD-657 528 Not available from CFSTI.

5K. Sociology

THE FEASIBILITY OF DEVELOPING TRANSFER OF TECHNOLOGY FUNCTIONS,
Howard Univ Washington D C
For primary bibliographic entry see Field 5C.
AD-657 040 Not available from CFSTI.

TRAINING, TASKS AND MEDIATOR ORIENTATION IN HETEROCULTURAL NEGOTIATIONS.
Illinois Univ Urbana Group Effectiveness Research Lab
For primary bibliographic entry see Field 5J.
AD-657 353 HC$3.00 MF$0.65

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

QUANTITATIVE IMMUNOASSAY BY DISC ELECTROPHORESIS,
Army Research Inst of Environmental Medicine Natick Mass
Robert Louis-Ferdinand, and William F. Blatt.
27 Dec 66, 9p
Availability: Published in Clinica Chimica Acta, v16 p259-66 1967.

Descriptors: (*Antigen-antibody reactions, Electrophoresis), Immune serums, Serum albumin, Globulins, Immunity, Quantitative analysis.

A method is described whereby the extent of interaction between antigen and purified antibody solutions can be quantitatively determined. An immune globulin solution, prepared from horse antisera to human albumin, was admixed with large-pore spacer gel in polyacrylamide disc electrophoresis. Albumin, migrated in this system was, in part, retarded due to combination with antibody and subsequent exclusion of the complexed material from the small-pore separation gel. The interaction was quantitated by comparing the densitometric evaluation of the stained protein bands of antibody-reacted systems with samples in which the immune globulin was omitted. This method can be used to characterize the immunologic reactivity of various immune globulins in addition to permitting more detailed analyses of antigenic materials. (Author)
AD-656 818 Not available from CFSTI.

AN AUTOMATED METHOD FOR THE DETERMINATION OF SERUM CALCIUM WITH GLYOXAL BIS (2-HYDROXYANIL),
Army Research Inst of Environmental Medicine Natick Mass
Genevieve Farese, Janice L. Schmidt, and Milton Mager. 7 Dec 66, 6p
Availability: Published in Clinical Chemistry v13 n6 p515-20 Jun 1967.

Descriptors: (*Blood serum, Calcium), (*Calcium, Colorimetric analysis), (*Colorimetric analysis, Automatic), Chemical indicators, Aldehydes, Organic nitrogen compounds, Instrumentation, Recording systems.
Identifiers: Glyoxal bis (hydroxyanils).

A completely automated analysis is described for the determination of serum calcium with glyoxal bis (2-hydroxyanil) solution (GBHA). The method is simple and precise, and the data obtained are in good agreement with results obtained by the manual GBHA procedure. (Author)
AD-656 820 Not available from CFSTI.

THE DETERMINATION OF MAXIMUM BILIRUBIN BINDING CAPACITY OF HUMAN ALBUMIN AND SERUM BY A CALCIUM CARBONATE ADSORPTION TECHNIQUE,
Walter Reed Army Inst of Research Washington D C
Roman B. Rutkowski. 3 Feb 67, 8p
Availability: Published in Clinica Chimica Acta v17 p31-8 1967.

Descriptors: (*Bile pigments, Blood chemistry), Chemical analysis, Serum albumin, Molecular association, Calcium compounds, Carbonates, Lipoproteins.

It was demonstrated that calcium carbonate selectively adsorbs unbound bilirubin from bilirubin-albumin solutions. A batch adsorption assay has been devised and used for studying bilirubin binding by albumin and serum preparations. Serum gave variable but consistently higher bilirubin/albumin molecular binding ratios than did purified albumin when tested in dilute solutions. In more concentrated solutions serum binding capacity decreased dramatically. Results obtained in studies testing serum and plasma protein fractions for their effect of bilirubin binding by albumin, suggested that an interaction of albumin with a high density lipoprotein influenced binding capacity. (Author)
AD-656 824 Not available from CFSTI.

MALARIAL PARASITE METABOLISM: THE PENTOSE CYCLE IN PLASMODIUM BERGHEI,
SEATO Medical Research Lab Bangkok (Thailand) Parasitology Dept
For primary bibliographic entry see Field 6C.
AD-656 825 Not available from CFSTI.

SOLUBLE ANTIGEN FLUORESCENT ANTIBODY TEST (SAFA) FOR HUMAN FILARIASIS,
Walter Reed Army Inst of Research Washington D C
R. E. Duxbury, and E. H. Sadun. 3 Jun 66, 6p
Availability: Published in Experimental Parasitology v20 n1 p77-82 Feb 1967.

Descriptors: (*Filariae, *Serodiagnosis), (*Fluorescent antibody techniques, Filariae), Parasitic diseases, Antigens + antibodies, Immunity, Antigen-antibody reactions, Test methods, Diseases.

A test was developed for the serologic diagnosis of bancroftian filariasis and onchocerchiasis by using soluble extracts of adult Dirofilaria uniformis, D. immitis, or Dipetalonema witei as antigen. The test is performed by immersing cellulose acetate filter paper discs in the antigen solution and allowing them to dry. The discs are then incubated in diluted serum, rinsed in a buffered saline solution, soaked in fluorescein-conjugated antiserum, rinsed again, and mounted on tape. The tape is placed on the drum of the chromatograph door of a fluorometer to determine objectively the degree of fluorescence of the individual discs. This technic was evaluated with 259 human sera from well-documented cases. Reactions were observed in 82% of sera from bancroftian filariasis patients and 86% from onchocerciasis patients, whereas 97% of sera from healthy controls gave negative results in the test. Most of the 'false' negatives occurred in adolescents and all of them were in persons under 30 years of age. Few cross reactions were observed with sera from individuals with proven trematode, nematode, protozoan, mycotic, and bacterial infections and with sera from patients with lupus erythematosus. Occasional cross reactions were obtained with sera from individuals with schistosomiasis haematobia, leishmaniasis, and leprosy. Since these sera were collected in areas which are endemic for filariasis, it is possible that the reactions were specific. (Author)
AD-656 826 Not available from CFSTI.

THE DETERMINATION OF CHROMIUM IN BIOLOGICAL MATERIALS BY ATOMIC ABSORPTION SPECTROSCOPY,
Walter Reed Army Inst of Research Washington D C
Fredric J. Feldman, Edward C. Knoblock, and William C. Purdy. 16 Dec 66, 9p
Prepared in cooperation with Maryland Univ., College Park.
Availability: Published in Analytica Chimica Acta, n38 p489-97 1967.

Descriptors: (*Tissues (Biology), Chromium), (*Chromium, Atomic spectroscopy), Absorption spectrum, Blood, Urine, Blood plasma, Diet.

Biological samples were mineralized with a mixture of nitric, sulfuric, and perchloric acids. The chromium was oxidized to chromium (VI) followed by extraction into methyl isobutyl ketone in the cold. The ketone extract was aspirated into a fuel-rich hydrogen-air flame, and the absorption recorded using the 357.9 nm line of chromium. The limit of detection for chromium was found to be 10 p.p.b. Tissue chromium levels of normal albino rats were determined. Increased chromium values were observed for animals maintained on a high chromium diet compared to those fed a deficient diet. (Author)
AD-656 827 Not available from CFSTI.

EFFECT OF ENVIRONMENTAL TEMPERATURE ON FATTY LIVERS PRODUCED BY VARIOUS HEPATOTOXIC AGENTS IN RATS.
Research paper,
Defence Research Medical Labs Toronto (Ontario)
M. W. Radomski, and T. Orme. 2 Nov 66, 4p
Rept no. DRML-RP-631
Availability: Published in The Journal of Nutrition v92 n1 p19-22 May 1967.

Descriptors: (*Lipids, *Liver), Temperature, Cold weather tests, Toxicity, Deficiency diseases, Diet, Nutrition, Fats, Ethanols, Cholines, Canada.

The effect of a low environmental temperature on the development of fatty infiltration of the liver after various treatments was studied. Rats, housed at environmental temperatures of 22C and 4C for 14 days, were treated with a choline-deficient diet, carbon tetrachloride, ethionine, 4-aminopyrazolopyrimidine, orotic acid, or ethanol. Fatty liver was produced by each of the treatments in the rats housed at 22C. A temperature of 4C prevented the development of fatty liver in the rats fed the choline-deficient diet in confirmation of previous results but had no effect on fatty livers caused by the administration of carbon tetrachoride, ethionine, 4-aminopyrazolopyrimidine, and orotic acid. A partial lipotropic effect of cold exposure was observed in the animals treated with ethanol. (Author)
AD-656 834 Not available from CFSTI.

THERMAL MUTAROTATION IN POLYCRYSTALLINE ALPHA-D-GLUCOSE,
British Columbia Univ Vancouver Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-656 850 Not available from CFSTI.

ERYTHROCYTIC ABNORMALITIES IN EXPERIMENTAL MALARIA,
Walter Reed Army Inst of Research Washington D C
James N. George, Donna J. Wicker, Bernard J. Fogel, Charles E. Shields, and Marcel E. Conrad. 1 Apr 66, 4p

Availability: Published in Proceedings of the Society for Experimental Biology and Medicine v124 p1086-9 1967.

Descriptors: (*Plasmodium, *Erythrocytes), Osmotic pressure, Morphology (Biology), Hematology, Permeability, Diseases.

Studies of erythrocytic indices and osmotic response revealed the presence of 2 abnormal populations of cells in hamsters infected with Plasmodium berghei. One population consisted of mature nonparasitized cells which became abnormally small and spherocytic with a diminished cellular surface area. This cell shrinkage could result from the hyperspienism of malaria or possibly from immunologic membrane damage. The other population was composed of parasitized reticulocytes which exhibited an increased rate of swelling in hypotonic saline, indicating impairment of the normal restricted cation permeability. (Author)
AD-656 864 Not available from CFSTI.

MINERAL NUTRIENT REQUIREMENTS OF CHLORELLA SORKINIANA IN CONTINUOUS PURE CULTURE.
Final rept. 1 Apr 64-29 Apr 66,
Monsanto Research Corp Dayton Ohio Dayton Lab
Eyster H. Clyde. May 67, 60p
SAM-TR-67-40
Contract AF 41 (609)-2414

Descriptors: (*Chlorella, Nutrition), Culture media, Regeneration, Photosynthesis, Life support, Minerals, Growth.

Mineral nutrient requirements of Chlorella sorokiniana under suitable sterile conditions were studied in a photothermostat and in two continuous culture units at constant densities of 2 microliters/ml. and 20 microliters/ml. Minimum, optimum, and maximum concentrations for each of the following essential elements are reported: N, P, Mg, S, K, Fe, Ca, Mn, Zn, and Cu. Additional studies with B, Mo, Co, Na, Cl, and ethylenediaminetetracetate (EDTA) are also reported. Optimum nutrient requirements were compared at growing temperatures of 25 and 39C., and at 4.8% and 0.51% concentrations of carbon dioxide in air. The hydrogen ion requirement was determined. An optimal medium was formulated and evaluated in sterile photothermostatic and pure continuous cultures. The effluent medium was reconstituted after each harvest by replenishing the supernatant medium with essential elements and then was returned to the culture. (Author)
AD-657 031 HC$3.00 MF$0.65

INVESTIGATIONS ON THE ROLE OF ELECTRON CARRIERS IN PHOTOSYNTHESIS IN CELL-FREE SYSTEMS.
Final scientific rept. 1 May 63-30 Apr 67,
Goettingen Univ (West Germany) Inst for Plant Physiology
A. Trebst. 1 May 67, 19p
AFCRL-67-0442
Contract AF 61 (052)-716

Descriptors: (*Photosynthesis, In vitro analysis), Chloroplasts, Bacteria, Electrons, Transport properties, Amines, Quinones, Adenosine phosphates, Phosphorylation, Organic pigments, Ascorbic acid, Oxidation, Nucleotides, Reduction (Chemistry), Antimetabolites, West Germany.
Identifiers: Phenylene diamines, Electron transfer.

A summary is given on the use of p-phenylenediamines as artificial electron donors and quinones as electron acceptors in investigations on the mechanism of electron transport of chloroplasts and photosynthetic bacteria. p-Phenylenediamines bypass the DCMU inhibition site of electron transport, DAD being the best electron donor for chloroplasts described so far. NADP reduction in chloroplasts at the expense of DAD is coupled to ATP formation, but at the expense of TMPD is not. NAD reduction in particles from Rhodospirillum at the expense of DAD is antimycin sensitive. Detailed studies of these systems give indication as to the location of the phosphorylating site and on the function of plastoquinone and of plastocyanin. Quinones were used as artificial electron acceptors in the study of the photooxidation of ascorbate and in the light inactivation of chloroplasts. Disalicylidenediamines are described as inhibitors of photosynthetic NADP reduction in chloroplasts, but not in photosynethetic bacteria. (Author)
AD-657 039 HC$3.00 MF$0.65

THE RELATIONSHIP BETWEEN DEHYDRATION AND FREEZING INJURY IN THE HUMAN ERYTHROCYTE,
Naval Medical Research Inst Bethesda Md
Harold T. Meryman. 1967, 17p
Proceedings of International Conference on Low Temperature Science, Sapporo (Japan), 1967.
Availability: Published in Cellular Injury and Resistance in Freezing Organisms v2 p231-44 1966.

Descriptors: (*Erythrocytes, Freezing), Hemolysis, Low-temperature research, Water, Ice, Dehydration, Survival, Glycerols, Crystallization.
Identifiers: Cryobiology.

Analyses were made of the relationship between hemolysis, temperature, glycerol concentration and the proportion of water converted to ice. This made it possible to designate a certain proportion of the water in erythrocytes as 'vital' and has enabled the formulation of a single hypothesis which explains the survival of red cells following both rapid and slow freezing in the presence of either diffusable or non-diffusable additives. (Author)
AD-657 061 Not available from CFSTI.

OBSERVATION OF THE SPECTRUM OF LIGHT SCATTERED BY SOLUTIONS OF BIOLOGICAL MACROMOLECULES,
Massachusetts Inst of Tech Cambridge Dept of Physics
For primary bibliographic entry see Field 20F.
AD-657 098 Not available from CFSTI.

COMPARATIVE LIPID COMPOSITION OF PSITTACOSIS AND TRACHOMA AGENTS,
Washington Univ Seattle Dept of Preventive Medicine
For primary bibliographic entry see Field 6M.
AD-657 493 Not available from CFSTI.

6B. Bioengineering

VECTORCARDIOGRAPHIC DIAGNOSIS USING THE POLYNOMIAL DISCRIMINANT METHOD OF PATTERN RECOGNITION.
Lockheed Missiles and Space Co Palo Alto Calif Lockheed Palo Alto Research Lab
For primary bibliographic entry see Field 6E.
AD-657 066 Not available from CFSTI.

6C. Biology

MALARIAL PARASITE METABOLISM: THE PENTOSE CYCLE IN PLASMODIUM BERGHEI,
SEATO Medical Research Lab Bangkok (Thailand) Parasitology Dept
Bernhardt W. Langer, Jr., Pirom Phisphumvidhi, and Yael Friedlander. 18 Nov 66, 9p
Availability: Published in Experimental Parasitology v20 n1 p68-76 Feb 1967.

Descriptors: (*Plasmodium, Metabolism), Pentoses, Oxidoreductases, Enzymes, Mice, Thailand.

The activities of glucose-6-phosphate dehydrogenase, 6-phosphogluconate dehydrogenase, and transketolase were studied in cell-free extracts of normal and Plasmodium berhgei-infected mouse erythrocytes and host cell-free P. berghei. All preparations had activity. The data presented clearly indicated that the enzyme activities found in the P. berghei extract were of parasitic origin. The presence of phosphoriboisomerase and ribulose phosphate-3-epimerase were indirectly demonstrated. The data supported the conclusion that the malaria parasite, P. berghei has an active pentose cycle. (Author)
AD-656 825 Not available from CFSTI.

SOLUBLE ANTIGEN FLUORESCENT ANTIBODY TEST (SAFA) FOR HUMAN FILARIASIS,
Walter Reed Army Inst of Research Washington D C
For primary bibliographic entry see Field 6A.
AD-656 826 Not available from CFSTI.

ADAPTATION OF WHITE MICE (MUS MUSCULUS) TO REPEATED COOLING.
Research paper,
Defence Research Medical Labs Toronto (Ontario)
David M. Ogilvie. 7 Nov 66, 7p Rept no. DRML-RP-641
Availability: Published in Canadian Journal of Zoology v45 p321-7 1967.

Descriptors: (*Body temperature, Adaptation (Physiology)), Exposure, Hypothermia, Heat production (Biology), Acclimatization, Stress (Physiology), Canada.
Identifiers: Cold tolerance.

The effects, on the body temperature of white mice, of repeated short exposures to cold were investigated using two methods of restraint. Animals held in a flattened posture became hypothermic at room temperature, cooled more than five times as fast at -10C as mice that could adopt a heat-conserving posture, and continued to cool for some time after they were removed from the cold. With repeated tests, cooling at room temperature decreased, and an improvement in rewarming ability was observed. In addition, with lightly restrained mice, the fall in rectal temperature during cold exposure showed a progressive decrease, a phenomenon not observed with severely restrained animals. (Author)
AD-656 835 Not available from CFSTI.

MYSTROMYS ALBICAUDATUS (THE AFRICAN WHITE-TAILED RAT) AS A LABORATORY SPECIES,
Armed Forces Inst of Pathology Washington D C
Allen Hall, III, Ronald L. Persing, David C. White, and Robert T. Ricketts, Jr. 1967, 10p
Availability: Published in Laboratory Animal Care v17 n2 p180-8 1967.

Descriptors: (*Laboratory animals, *Rats), Maintenance, Reproduction (Physiology), Pregnancy, Physiology, Anatomy, Diet, Handling, Histology, Biopsy, Pathology.

An introduction of the African white-tailed rat (Mystromys albicaudatus) as a laboratory animal is presented. Prior experimental uses of the rat are enumerated. Observations during the maintenance of a colony of Mystromys for 3 years are included. Adult Mystromys are medium-sized rodents, weighing between 95 and 145 grams and having a body length of 19 to 27 centimeters. Females have four inguinal mammae, average three young per litter, and wean 80 percent of their young. They are regular breeders in the laboratory. The gestation period is 38 days; most females rebreed within 2 days following parturition. Mystromys live up to 6 years of age. Other subjects discussed are behavior and appearance, gross and histologic anatomy, and physiology. Mystromys are easily

maintained on regular laboratory rodent diet. Other aspects of care, feeding, and handling are mentioned. Mystromys are clean in their habits and have no objectionable odor. The colony is free of chronic murine respiratory disease, neoplasms, parasitism, or any enzootic pathologic findings seen routinely at necropsy. (Author)
AD-656 846 Not available from CFSTI.

INTRAMITOCHONDRIAL FILAMENTOUS BODIES IN THE THICK LIMB OF HENLE OF THE RAT KIDNEY,
Armed Forces Inst of Pathology Washington D C
Teruo Suzuki, and F. K. Mostofi. 1967, 19p
Availability: Published in The Journal of Cell Biology v33 n3 p605-24 1967.

Descriptors: (*Mitochondria, Granules), (*Kidneys, Mitochondria), Rats, Cells (Biology), Electron microscopy, Morphology (Biology), Pathology.

'Intramitochondrial filamentous bodies' (IMFB) were occasionally found within the matrix of some mitochondria of the thick limb of Henle of the rat kidney, but not elsewhere in the tubular system. Three types were recognized: type I, an accumulation of filaments 55 A thick; type II, a bundle of parallel filaments having the same thickness as those of type I and regular spacing, 87 A apart, from center to center; and type III, consisting of type II with regular light bands of 280 A periodicity and a helical border of prismatic tubular cristae. In addition to these, electron-opaque masses showing variable and faint substructures were found in the matrix of mitochondria. It is suggested that all these IMFB may originate from mitochondrial cristae and that type II IMFB may be an intermediate developmental form between type I and type III. After uranyl acetate staining, IMFB and the membranes of prismatic tubular cristae showed highly increased electron opacity. The literature has been reviewed for reports of intramitochondrial filamentous inclusions in various types of cells. These inclusions have been classified according to their structural characteristics and the localization in the mitochondria and compared with IMFB reported herein. (Author)
AD-656 848 Not available from CFSTI.

ECOLOGY OF PLAGUE IN VIETNAM. I. ROLE OF SUNCUS MURINUS,
Walter Reed Army Inst of Research Washington D C
J. D. Marshall, D. V. Quy, F. L. Gibson, T. C. Dung, and D. C. Cavanaugh. 15 Dec 66, 4p
Availability: Published in Proceedings of the Society for Experimental Biology and Medicine v124 p1083-6 1967.

Descriptors: (*Pasteurella pestis, Disease vectors), Vietnam, Diseases, Epidemiology, Mammals, Siphonaptera, Spleen, Ecology.
Identifiers: Suncus murinus.

Pasteurella pestis was isolated from 7 Suncus murinus spleen pools and 3 flea pools obtained from it. Lesions indicating an acute infection were not observed in any of the 1,757 animals examined. When pooled sera were examined, 15 of 55 pools had titers of 1:16-1:256 against fraction I of P. pestis. (Author)
AD-656 860 Not available from CFSTI.

FINE STRUCTURE OF THE ASEXUAL STAGES OF PLASMODIUM ELONGATUM,
Walter Reed Army Inst of Research Washington D C
Masamichi Aikawa, Clay G. Huff, and Helmuth Sprinz. 15 Dec 66, 21p
Availability: Published in Journal of Cell Biology v34 n1 p229-49 1967.

Descriptors: (*Plasmodium, Life cycle), Erythrocytes, Ingestion (Physiology), Bone marrow, Blood, Birds, Parasites.

Plasmodium elongatum, an avian malarial parasite, differs from other such parasites by infecting both the circulating red blood cells and the hematopoietic cells. The exoerythrocytic development of P. elongatum occurs mainly in these red cell precursors. The fine structure of the asexual stages of P. elongatum has been studied in the bone marrow and peripheral blood of canaries and compared with that of the asexual stages of other avian malarial parasites. With minor differences, the merozoites of P. elongatum possess the same organelles as those in the exoerythrocytic merozoites of P. fallax and the erythrocytic stages of P. cathemerium, P. lophurae, P. fallax, and P. gallinaceum. The developmental sequence is also essentially similar to that of other avian malarial parasites, in that upon entry into a new host cell, the dedifferentiation, growth, and redifferentiation phases take place. However, some important differences were found in the feeding mechanism of P. elongatum. The cytostome is involved in the ingestion of host cell cytoplasm in both exoerythrocytic and erythrocytic stages, in contrast to P. fallax, in which the cytostome is inactive in the exoerythrocytic stages. In P. elongatum, host cell cytoplasm is ingested through the cytostome, and 'boluses' are formed and incorporated into a large digestive vacuole. Subsequently, the digestion of the boluses takes place in this digestive vacuole. Thus, in regard to the function of the cytostome, the exoerythrocytic stages of P. elongatum appear to be closely related to the erythrocytic stage which has a feeding mechanism similar to that of the erythrocytic stage of other avian malarial parasites. (Author)
AD-656 865 Not available from CFSTI.

INSULIN-LIKE ACTIVITY FROM THE SPARGANUM OF SPIROMETRA MANSONOIDES,
Walter Reed Army Inst of Research Washington D C
Dan R. Harlow, Walter Mertz, and Justus F. Mueller. 10 Feb 67, 7p
Availability: Published in Journal of Parasitology v53 n3 p449-54 Jun 1967.

Descriptors: (*Platyhelminths, Tissue extracts), (*Parasitic diseases, Metabolism), Solvent extraction, Adipose tissue, In vitro analysis, Glucose, Oxidation, Lipids, Cells (Biology), Penetration, Permeability, Body weight, Growth, Rats.

Extracts have been prepared from the sparganum of Spirometra mansonoides by alkaline digestion and solvent extraction. Addition of these extracts to rat epididymal adipose tissue in vitro stimulated glucose oxidation, utilization of medium glucose for lipogenesis, and cell penetration of D-galactose. Permeability of adipose tissue to D-sorbitol was not influenced. (Author)
AD-656 867 Not available from CFSTI.

ADIASPIROMYCOSIS IN SMALL MAMMALS OF NEW MEXICO,
Walter Reed Army Inst of Research Washington D C
Robert L. Taylor, Bryan E. Miller, and James H. Rust, Jr. 1967, 6p
Availability: Published in Mycologia v59 n3 p513-8 May-Jun 1967.

Descriptors: (*Mammals, *Fungi), Distribution, New Mexico, Culture media, Spores, Morphology (Biology), Diseases.

Small desert mammals collected in New Mexico as part of a surveillance of the natural reservoir of Pasteurella pestis were examined for naturally acquired mycotic infections. Cultures of lung, liver and spleen were prepared from a total of 249 animals representing 12 genera, and adiaspiromycosis caused by Emmonsia parva was detected in 18%. These isolations are the first from this region and extend the known endemic area eastward from Arizona to include a large part of New Mexico. Neither Coccidioides immitis nor Histoplasma capsulatum was isolated from these animals. (Author)
AD-656 869 Not available from CFSTI.

THE TRANSFORMATION OF THE PLASMODIUM GALLINACEUM OOCYST IN AEDES AEGYPTI MOSQUITOES,
Walter Reed Army Inst of Research Washington D C
John A. Terzakis, Helmuth Sprinz, and Ronald A. Ward. 13 Jan 67, 17p
Availability: Published in Journal of Cell Biology, v34 n1 p311-26 1967.

Descriptors: (*Plasmodium, Morphology (Biology)), Transformations, Aedes, Parasitic diseases, Spores, Nuclei (Biology), Mitochondria, Cytoplasm.

Sporoblast and sporozoite formation from oocysts of the avian malarial parasite, Plasmodium gallinaceum, after the seventh day of infection in Aedes aegypti mosquitoes offers an interesting example of differentiation involving the appearance and modification of several cellular components. Sporoblast formation is preceded by (a) invaginations of the oocyst capsule into the oocyst cytoplasm, (b) subcapsular vacuolization and cleft formation, (c) the appearance of small tufts of capsule material on the previously noted invaginations, and (d) linear dense areas located just below the oocyst plasma membrane which predetermine the site of emerging sporozoites from the sporoblast. The subcapsular clefts subdivide the once-solid oocyst into sporoblast peninsulae. Within the sporoblast, nuclei migrate from the random distribution seen in the solid oocyst and come to lie at the periphery of the sporoblast just below the linear dense areas noted in the earlier stage. A typical nuclear fiber apparatus occurs in most of the nuclei seen in random sections at this stage although such a fiber apparatus may occasionally be seen in the solid oocyst stage. The nucleus, its associated fiber apparatus, and the overlying dense area appear to induce the onset of sporozoite budding from the sporoblast as well as the formation of the sporozoite pellicular complex and the paired organelle precursor. Several mitochondria are present in each sporozoite, in contrast to the single mitochondrion seen in the merozoites of the erythrocytic and exoerythrocytic stages of avian malaria infection. The paired organelles and associated dense inclusion bodies are formed by condensation of an irregular meshwork of membrane-bound, coarse, dense material. (Author)
AD-656 870 Not available from CFSTI.

COOLING AT -10C AS AN INDEX OF COLD ACCLIMATION IN WHITE MICE.
Research paper,
Defence Research Medical Labs Toronto (Ontario)
D. M. Ogilvie. 15 Mar 67, 6p Rept no. DRML-RP-666
Availability: Published in Canadian Journal of Physiology and Pharmacology v45 p748-52 1967.

Descriptors: (*Acclimatization, *Body temperature), Exposure, Cooling, Hypothermia, Adaptation (Physiology), Mice, Canada.

During the 21-day acclimation period used in this study, the ability of mice to resist hypothermia developed rapidly during the first week, after which little further change took place. This pattern of adaptation closely resembles that revealed by previous investigations into other aspects of continuous cold exposure. (Author)
AD-656 878 Not available from CFSTI.

ELECTRICAL ACTIVITY OF RECEPTORS, ASSOCIATED WITH MAINTENANCE OF FLIGHT, IN THE LOCUST,

Naval Medical School Bethesda Md Translation Service
V. L. Sviderskii. 5 Jul 67, 7p Rept no. NMS-Trans-2036
TT-67-62584
Elektricheskaya Aktivnost Retseptorov, Svyazannykh s Podderzhaniem Poleta, u Saranchi, trans. of Akademiya Nauk SSSR. Doklady, v172 n5 p1230-3 1967.

Descriptors: (*Orthoptera, Sensory mechanisms), (*Insects, Flight), Vibration, Sensory perception, Electrophysiology, Stimulation, Responses, USSR.

The studied locust receptors are mechanoreceptors which, by the nature of their response, somewhat resemble certain tactile receptors in the paws of the fly. The essential factor for the activation of the receptor is the static shifting, and not the vibration of the cilium which occurs during its subjection to blowing of air. These receptors belong in the group of slowly adapting receptors and the final frequency of the order of 50-70 imp/sec, apparently, is adequate for the maintenance of the active state of the system which controls the flight of the insect. (Author)
AD-656 919 HC$3.00 MF$0.65

INDEX CATALOGUE TO RUSSIAN, CENTRAL AND EASTERN EUROPEAN, AND CHINESE LITERATURE IN MEDICAL ENTOMOLOGY. SUPPLEMENT 2. TICKS.
Maryland Univ College Park Dept of Zoology
1967, 136p
TT-67-62585
Contract DA-49-193-MD-2238
See also AD-419 007.

Descriptors: (*Ticks, Bibliographies), Entomology, Disease vectors, Epidemiology, Diseases, Ecology, Parasitic diseases, USSR, Eastern Europe, China, Indexes.

The volume represents the second of the supplements to the Index Catalogue to Russian, Central and Eastern European, and Chinese Literature in Medical Entomology, which consisted of eleven volumes. The eleven volumes were comprised of the backlog of references on hand up to the time of publication, while the supplements contain those references which have become available since publication of the original volumes.
AD-656 932 HC$3.00 MF$0.65

INDEX CATALOGUE TO RUSSIAN, CENTRAL AND EASTERN EUROPEAN, AND CHINESE LITERATURE IN MEDICAL ENTOMOLOGY. SUPPLEMENT 3. FLEAS, MITES AND MISCELLANEOUS ARTHROPODS.
Maryland Univ College Park Dept of Zoology
1967, 106p
TT-67-62586
Contract DA-49-193-MD-2238
See also AD-425 817, AD-609 045, and AD-609 046.

Descriptors: (*Siphonaptera, Bibliographies), (*Mites, Bibliographies), (*Arthropods, Bibliographies), Entomology, Disease vectors, Epidemiology, Diseases, Ecology, USSR, Eastern Europe, China, Indexes.

The volume represents the third of the supplements to the Index Catalogue to Russian, Central and Eastern European, and Chinese Literature in Medical Entomology, which consisted of eleven volumes. The eleven volumes were comprised of the backlog of references on hand up to the time of publication, while the supplements will contain those references which have become available since publication of the original volumes.
AD-656 933 HC$3.00 MF$0.65

PREVENTION OF ANAPHYLACTIC DEATH IN THE MOUSE TOXICITY PREVENTION TEST FOR TRIC AGENTS,
Washington Univ Seattle Dept of Preventive Medicine
E. Russell Alexander, and J. W. Fresh. May 67, 12p
NAMRU-2-TR-279
Grant PHS-BN-03144
Availability: Published in American Journal of Ophthalmology v63 n5 Pt2 p1462-9 May 1967.

Descriptors: (*Anaphylaxis, Mice), (*Miyagawanella, Classification), Toxicity, Vaccines, Immunity, Mortality rates, Drugs, Protection, Epinephrine, Parenteral infusions, Chlorpromazine, Reserpine, Corticosteroid agents, Dosage, Effectiveness.
Identifiers: TRIC agents.

The phenomena of prompt death and toxic death of immunized mice when challenged with intravenous TRIC agents may be distinguished clinically and pathologically. In both respects the prompt death phenomenon is similar to mouse anaphlaxis. This prompt death phenomenon may be prevented by various drugs that prevent mouse anaphylaxis. Aqueous epinephrine, given immediately before challenge, is effective in prevention of mouse anaphylaxis, as is chlorpromazine. Promethazine and reserpine are effective when given at longer intervals before challenge. The last 3 drugs have considerable side-effects on experimental animals. Cortisone is effective in large doses. The inbred strain of mice DBA/2 are refractory to prompt death, while they do exhibit toxic death to intravenous TRIC agents. On the basis of these findings we now routinely employ aqueous epinephrine (0.02 mg I. P. per 16-gm mouse less than 5 minutes before challenge) in the conduct of the mouse toxicity prevention test. (Author)
AD-656 946 Not available from CFSTI.

LYSOSOME STABILIZING AGENTS FOR HYPOTHERMIC KIDNEY PRESERVATION,
Naval Medical Research Inst Bethesda Md
Paul A. Lotke. Oct 66, 6p
Availability: Published in Nature v212 p512-3 1966.

Descriptors: (*Kidneys, Preservation), Hypothermia, Storage, In vitro analysis, Freezing, Corticosteroid agents, Cinchona alkaloids, Cells (Biology), Membranes (Biology), Granules, Stabilization, Transplantation, Tissues (Biology).

Chloroquine and hydrocortisone were shown to have beneficial effects on the storage of whole organs in vitro. A possible mechanism of action for these agents may be the stabilization of lysosomal membranes and the protection of the cell against autodigestion. (Author)
AD-657 044 Not available from CFSTI.

THE CARE AND MANAGEMENT OF CAPTIVE CHIMPANZEES WITH SPECIAL EMPHASIS ON THE ECOLOGICAL ASPECTS,
Amsterdam Univ (Netherlands)
J. A. R. A. M. van Hooff. Aug 67, 61p
ARL-TR-67-15
Contract AF 61 (052)-799

Descriptors: (*Chimpanzees, Ecology), Handling, Housing, Reproduction (Physiology), Adaptation (Physiology), Tolerances (Physiology), Behavior, Environment, Diet, Hygiene, Biological laboratories, Stress (Physiology), Stress (Psychology).

There are indications that present methods for the care and management of captive chimpanzees are not fully adequate, particularly from an ecological point of view, resulting in a physiological and especially psychological condition of the animals which is below optimal. In contrast to what is reported from the wild, many captive animals become apathic and dull, indulge in stereotypic behavior patterns and become very aggressive and unpredictable as they get older. The fact that the present reproduction rate in captivity appears much too low to make a continuous importation from the wild unnecessary was also regarded as significant in connection with the conditions of captive chimpanzees. These points and their causes as well as possibilities for improvement are discussed. (Author)
AD-657 048 HC$3.00 MF$0.65

THE RELATIONSHIP BETWEEN DEHYDRATION AND FREEZING INJURY IN THE HUMAN ERYTHROCYTE,
Naval Medical Research Inst Bethesda Md
For primary bibliographic entry see Field 6A.
AD-657 061 Not available from CFSTI.

A SIMPLE TECHNIQUE FOR WET-MOUNT LABELLING,
Armed Forces Inst of Pathology Washington D C
Martin G. Levine. 1967, 2p
Availability: Published in Medical and Biological Illustrations v17 n3 p209-10 Jul 1967.

Descriptors: (*Histological techniques, Labels), Tissues (Biology), Preservation, Museums.

The use of included labels prevents the loss of separate explanatory cards and eliminates the need for replacement of record cards worn out by handling, dust and old age. It provides uniform legibility and dispenses with costly engraving equipment such as the pantograph. This technique has been used in museum specimens for approximately two years with no evidence of deterioration, but it is obviously too early to state how permanent the lable will prove to be. The fluid used for mounting is Shein solution (1951), but transparencies have also been tested in 10 per cent formalin and Wentworth solution (1947) with good results. Colour transparencies appear to be as stable as black and white. (Author)
AD-657 072 Not available from CFSTI.

REPRODUCTION AND DEVELOPMENT OF P. JAPONICUS OFF THE COAST OF SOUTHERN SAKHALIN,
Naval Oceanographic Office Washington D C
T. V. Dekhnik. 1967, 17p Rept no. NOO-Trans-307
TT-67-62674
Razmnozhenie i Razvitie Yaponskoi Skumbrii Preumatophorus Japonicus (Houttuya) y Beregov Yuzhnogo Sakhalina, trans. of Issledovaniya Fauny Morei (USSR) n6 p97-108 1959, see also AD-657 304.

Descriptors: (*Fishes, Reproduction (Physiology)), Japan Sea, Okhotsk Sea, Marine biology, Data, Eggs, Larvae, Growth.

The spawning of mackerels occurs usually in the spring-summer period. The Pacific species of the genus Pneumatophorus reproduces in the summer, while the Atlantic species of Scomber spawn mainly in the spring, but in the North Sea the spawning occurs from mid-May to the beginning of August. Along the Primor'ye coast P. japonicus spawns from June to September. The size of the eggs of the mackerel fluctuates from 0.86 to 1.38 mm. P. japonicus and S. scombrus that spawns in the North Sea have larger eggs, 0.89 to 1.32 mm. and 0.9 to 1.38 mm., respectively. S. scombrus that spawns in the Mediterranean Sea has the smallest eggs, namely, 0.86 to 1.04 mm. Generally the size of the fat gland corresponds to the size of egg. The length of newly-developed larvae of P. japonicus and P. diego is about 3 mm., that of S. scombrus about 3.5 to 3.9 mm. Differences are also noticeable in the development of rays in the fins of these species of mackerels. (Author)
AD-657 291 HC$3.00 MF$0.65

SOME DATA ON THE ZOOPLANKTON OF THE WEST COAST OF SOUTH SAKHALIN,
Naval Oceanographic Office Washington D C
L. A. Ponomareva. 1967, 19p Rept no. NOO-Trans-304
TT-67-62672
Nekotorye Dannye po Zooplanktonu Zapadnogo Poberezhya Yuzhnogo Sakhalina, trans. of Issledovaniya Fauny Morei (USSR) n6 p47-57 1959, See also AD-657 293.

Descriptors: (*Plankton, Japan Sea), Marine biology, Ocean currents, Fishes, Distribution, Straits, Data.
Identifiers: Tartar Strait.

The paper is based on data processing of 314 plankton samples obtained with the Juday net of the SW coast of Sakhalin in March, April, July, August and September 1948. It appears that in the ostrov Moneron area the largest biomass was observed west of o. Moneron; whereas the smallest biomass was observed in the cold spots of the Kril'on Current area and in the warm spots of the Tsushima Current area during August. The basic species for the area of Calanus plumchrus, Parathemisto japonica, etc. West of the mys Slepikovskogo area the distribution pattern of zooplankton is as follows: the upper layer (0-50m) is the richest. Downward the biomass abruptly decreases. The basic species for this area are Calanus plumchrus, Pseudocalanus elongatus, Oithona similis, Paranthemisto japonica.
AD-657 292 HC$3.00 MF$0.65

INVESTIGATIONS OF ICHTHYOPLANKTON CARRIED OUT BY THE KURILE-SAKHALIN EXPEDITION,
Naval Oceanographic Office Washington D C
T. S. Rass. 1967, 24p Rept no. NOO-Trans-306
TT-67-62671
Issledovaniya Ikhtioplanktona, Proizvedennye Kurilo-Sakhalinskoi Ekspeditsii, Trans. of Issledovaniya Fauny Morei (USSR) n6 p78-96 1959, See also AD-657 294.

Descriptors: (*Plankton, Pacific Ocean), (*Fishes, Reproduction (Physiology)), Japan Sea, Okhotsk Sea, Marine biology, Periodic variations, Data, Larvae, Eggs, Motion.

The areas investigated by the Kurile-Sakhalin expedition are used as spawning grounds by commercial fishes, such as cryophilic navaga, cod, walleye pollock and herring in winter and spring and yellowfin sole, long-snouted flounder and partly by Glyptocephalus sp., mackerel, redfish and ling cod in summer and autumn. In summer and autumn, the spawning grounds off the west and south coasts of Sakhalin are used by the schools coming from the west and southwest; the east coast of Sakhalin is visited by schools coming from the east. The spawning grounds off the Kurile Islands are occupied by local schools and by fishes migrating from the coast of Hokkaido. Thus, the spawning grounds off the west and south coast of Sakhalin are occupied mainly by the species of the Sea of Japan and partly by the species migrating from the west coast of Hokkaido. The spawning grounds off the east coast of Sakhalin are utilized by the Okhotsk ichthyofauna; the spawning grounds off the Kurile Islands are utilized by the local species as well as by the thermophilic species migrating from the east coast of Hokkaido. The travel routes of spawning schools of some of the species are presented by charts. Data on some of the samples obtained by the expedition are presented in special tables, pointing out the time, area, species and their quantity. (Author)
AD-657 293 HC$3.00 MF$0.65

THE QUALITATIVE AND QUANTITATIVE COMPOSITION OF PHYTOPLANKTON AND ITS DISTRIBUTION IN THE WATERS OF SOUTH SAKHALIN AND THE SOUTHERN KURILE ISLANDS,
Naval Oceanographic Office Washington D C
I. A. Kiselev. 1967, 27p Rept no. NOO-Trans-305
TT-67-62670
Kachestvennyi i Kolichestvennyi Sostav Fitoplanktona i ego Raspredelenie v Vodakh u Yuzhnogo Sakhalina i Yuzhnykh Kurilskikh Ostrovov, trans. of Issledovaniya Fauny Morei (USSR) n6 p58-77 1959, See also AD-657 292.

Descriptors: (*Plankton, Pacific Ocean), Japan Sea, Okhotsk Sea, Distribution, Marine biology, Algae, Data, Microorganisms.

In the south Sakhalin area, the greatest quantities and varieties of phytoplankton are observed off the west coast of Sakhalin, the smallest in Zaliv Terpeniya. The phytoplankton consists almost exclusively of diatom algae and dinoflagellates. Neritic species prevail over oceanic forms. Phytogeographically, boreal forms prevail, making up more than 50% of the total number of species. The percentage of temperate thermophilic and thermophilic species varies from place to place, the maximum being reached (29.3%) in the southern sector of the Sea of Okhotsk, then following the west coast of south Sakhalin (27.1%). Admixture of cryophilic forms (arctic and arctic boreal) is most clearly pronounced in Zaliv Aniva (19%), most weakly off the west coast of south Sakhalin. The quantity of phytoplankton is extremely variable during the summer season (July-Sept.). In the Kurile Islands area, the phytoplankton is represented mainly by diatom algae and dinoflagellates. The greatest diversity was observed in the South Kurile Strait. Neritic species prevail over oceanic forms. Boreal species prevail. The percentage of temperate thermophilic and thermophilic species in phytoplankton is rather high (27.7-28.4%). The quantity of phytoplankton in the South Kurile Strait is rather high, reaching 700-900 thousand cells per 1 liter of water. In the Pacific area the quantity is not uniform: near ostrov Shikotan and Zelenyy the quantity is much higher than far off the coast. In summer the greatest development of phytoplankton was observed in the coastal belt of the southern Kurile Islands. (Author)
AD-657 294 HC$3.00 MF$0.65

DATA ON THE REPRODUCTION AND DEVELOPMENT OF SOME FISH SPECIES INHABITING THE SOUTHERN SAKHALIN AND SOUTHERN KURILE REGIONS,
Naval Oceanographic Office Washington D C
I. I. Kazanova. 1967, 14p Rept no. NOO-Trans-308
TT-67-62680
Materialy po Razmnozheniyu i Razvitiyu Nekotorykh Ryb iz Vod Yuzhnogo Sakhalina i Yuzhnykh Kurilskikh Ostrovov, trans. of Issledovaniya Dauny Morei (USSR) n6 p132-40 1959, See also AD-657 291.

Descriptors: (*Fishes, Reproduction (Physiology)), Japan Sea, Okhotsk Sea, Pacific Ocean, Marine biology, Eggs, Larvae, Growth.

Some thermophilic species of the genera Engraulis, Cololabis and Calliongmus are found farther north than was assumed. Engraulis japonicus inhabits the southern Kurile area, Cololabis saira was found off the west coast of Sakhalin and in Zaliv Aniva, while the sea mouse (Callionymus sp.) was observed off the west coast of Sakhalin and off the southern Kurile Islands. The spawning time of these species varied from July to September, depending on the species and the geographical location. Redfishes spawn in August--September off the west coast of Sakhalin and in Zaliv Aniva, and in September in the southern Sakhalin and southern Kurile areas. The surface water temperatures at which the spawning and development occur varied from 9.9 to 21.0 deg., mainly from 11.9 to 16.4 deg. (Author)
AD-657 304 HC$3.00 MF$0.65

HYDROCARBONS IN DIGESTIVE TRACK AND LIVER OF A BASKING SHARK.
Woods Hole Oceanographic Institution Mass
For primary bibliographic entry see Field 8A.
AD-657 412 Not available from CFSTI.

SWIMBLADDER MORPHOLOGY OF SOME MESOPELAGIC FISHES IN RELATION TO SOUND SCATTERING.
Research rept.,
Navy Electronics Lab San Diego Calif
R. L. Capen. 20 Mar 67, 35p Rept no. NEL-1447

Descriptors: (*Fishes, *Morphology (Biology)), (*Sound transmission, *Underwater sound), Scattering, Acoustic properties, Gases, Bubbles, Urinary system, Marine biology, Naval research.

An examination was made of fresh and preserved specimens of Pacific lantern fishes, hatchet fishes, and hake. Most of the lantern fishes under 50-mm standard length contain gas in their swimbladders and, hence, are probably major sound scatterers. The hatchet fishes possibly contribute to scattering of nonmigratory layers. The resonance depths of the swimbladders differ widely for sound of different frequencies. Because of its larger size, the swimbladder of the hake should resonate at low frequencies.
AD-657 443 HC$3.00 MF$0.65

ECHINODERMS COLLECTED FROM A DRIFTING ICE ISLAND OFF THE EAST GREENLAND COAST, WITH COMMENTS ON THEIR DISTRIBUTION IN ADJACENT WATERS,
University of Southern California Los Angeles
Dept of Biological Sciences
Rey Stendell. 15 Aug 66, 10p
Contract Nonr-228 (19)
Availability: Published in Journal Fisheries Research Board of Canada v24 n4 p833-42 1967.

Descriptors: (*Echinodermata, *Ice islands), Marine biology, Ocean bottom sampling, Samplers, Deep water, Arctic regions, Greenland.

A collection of 127 echinoderms was made from the ice island Arlis II as it drifted southward along the east coast of Greenland. Sixteen species are represented: 2 crinoids, 4 asteroids, 8 ophiuroids, 1 echinoid, and 1 holothurian. Distributions of the animals are discussed in relation to their occurrence in Greenland and adjacent waters. Of the species collected 14 are characteristic of the east Greenland marine fauna; two are characteristic of the basin floor of the northern North Atlantic and are not commonly found in east Greenland coastal waters, and two have been recorded from both regions. (Author)
AD-657 487 Not available from CFSTI.

HOLOTHURIANS OF THE GENERA ELPIDIA AND KOLGA FROM THE CANADIAN BASIN OF THE ARCTIC OCEAN,
University of Southern California Los Angeles
Allan Hancock Foundation
Candido P. Agatep. 1967, 8p
Contract Nonr-228 (19), Grant NSF-G-19497
Availability: Published in Bulletin of the Southern Academy of Sciences v66 n2 p135-41 Apr-Jun 1967.

Descriptors: (*Marine biology, Arctic Ocean), (*Echinodermata, Arctic Ocean), Aquatic animals, Morphology (Biology).

A number of bottom samples taken from the drifting ice station Arlis II (Arctic Research Laboratory Ice Station 2) as it drifted across the Arctic Basin included representatives of two genera of elasipodid holothurians, Elpidia and Kolga. These specimens were found at two stations: 298 (Shirley) and 380 (Brusca), in the Canadian Basin, a subdivision of the Arctic Basin. At station 298 the

sixty-four specimens found appear to be the typical subspecies of Elpidia glacialis Theel and the fifty-seven animals from station 380 are Kolga hyalina Danielssen and Koren. These animals were collected by the use of a Menzies Trawl (Menzies, 1964) which employs a net with mesh opening of about 0.5 mm. Specimens are deposited in the collections of the Allan Hancock Foundation, University of Southern California, Los Angeles, California. (Author)
AD-657 506 Not available from CFSTI.

DETECTION OF EXTRATERRESTRIAL MICROORGANISMS BY MICROCALORIMETRY FINAL REPORT.
Beckman Instruments, Inc., Fullerton, Calif. Advanced Technology Operations.
Nov 66, 127p NASA-CR-73044, FR-2425-102
Contract NAS2-3477
Revised

Descriptors: *Calorimetry, *Extraterrestrial life, *Life detector, *Mars (planet), *Microorganism, Ambient, Cell, Characteristics, Data, Design, Detector, Enclosure, Environment, Extraterrestrial, Life, Microcalorimeter, Nutrient, Parameter, Power, Pressure, Programming, Sampler, Size, Sterilization, Structural, Surface, Temperature, Thermal, Weight.

For abstract, see STAR 05 19.
N67-33255 HC$3.00 MF$0.65

6D. Bionics

SOVIET CYBERNETICS: RECENT NEWS ITEMS NO. 7,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 9B.
AD-657 004 HC$3.00 MF$0.65

COMPUTER AND INFORMATION SCIENCES-II,
Battelle Memorial Inst Columbus Ohio Columbus Labs
For primary bibliographic entry see Field 9B.
AD-657 347 Not available from CFSTI.

A HAND-PRINTED CHARACTER RECOGNITION EXPERIMENT.
Northwestern Univ Evanston Ill Information-Processing and Control Systems Lab
For primary bibliographic entry see Field 9B.
AD-657 425 Not available from CFSTI.

INTRODUCTION TO MEDICAL CYBERNETICS.
Farnham (Frank C.) Co., Philadelphia, Pa.
R. M. Bayevskiy, and V. V. Parin. Jul 67, 227p
NASA-TT-F-459
Contract NASW-1497
Refs Transl. Into English of the Book "vvedeniye V Meditsinskvyu Kibernetiku" Moscow, Izdatelstvo Meditsina, 1966

Descriptors: *Cybernetics, *Diagnosis, *Medical electronics, *Medicine, Algorithm, Automatic, Bibliography, Biology, Control, Electronics, Information, Man-machine, Medical, Nervous, Patient, Physician, Physiology, System, Theory.

For abstract, see STAR 05 19.
N67-33159 HC$3.00 MF$0.65

TWO-DIMENSIONAL PATTERN DESCRIPTION AND RECOGNITION VIA CURVATURE-POINTS,
Stanford Linear Accelerator Center, Calif.
C. T. Zahn. Dec 66, 114p
Contract AT (04-3)-515

Descriptors: (*Pattern recognition, *Algorithms), Digital computers, Scanning.

For abstract, see NSA 21 16.
SLAC-70 HC$3.00 MF$0.65

6E. Clinical Medicine

PULMONARY EDEMA OF HIGH ALTITUDE: A REVIEW OF CLINICAL AND PATHOLOGICAL CONSIDERATIONS,
Army Research Inst of Environmental Medicine Natick Mass
H. L. Colcolough. 1967, 7p
Availability: Published in Military Medicine v31 n12 p1504-9 Dec 1966.

Descriptors: (*Lungs, *Edema), High altitude, Acclimatization, Pathology, Respiratory diseases, Therapy, Cardiovascular diseases, Blood coagulation, Reviews.

The review represents the majority of clinical and pathological material published since Hurtado's original description of acute pulmonary edema of altitude in 1937. In most instances there was an initial latent period of 12-72 hours before the onset of symptoms. Increasing dyspnea, orthopnea and productive cough usually indicated the onset of acute pulmonary edema. Physical examination of this stage often showed scattered bilateral rales. X-rays of the chest usually showed early fluffy bilateral hilar infiltrates. If treatment is initiated in this early stage reversal of the process is usually quite dramatic. If a more advanced stage of edema is allowed to develop response to treatment is more delayed. Bed rest and nasal O2 (100 per cent) is the treatment of choice. Digitalis, morphine, and diuretics may be necessary in the more refractory cases. Cardiac catheterization studies have shown only elevated pulmonary artery pressures. Only one left heart catheter study has been done. Pressures were within normal limits. Pulmonary wedge pressures have been normal in four patients. There have been approximately 540 cases of acute pulmonary edema attributed to high terrestrial altitude. Of these there were 31 deaths reported and 19 autopsies performed. In addition to congestion and edema which were universally present a significant number of cases showed intraaleveolar fibrin, thrombi, and hyaline membranes. Inhibition of the pulmonary plasminogen activator system has been suggested as the source of the hyaline membranes. (Author)
AD-656 817 Not available from CFSTI.

NEW CONCEPTS OF SHOCK AND ITS TREATMENT,
Walter Reed Army Inst of Research Washington D C
Robert M. Hardaway. 1967, 6p
Availability: Published in Clinical Medicine v74 p33-44 May 1967.

Descriptors: (*Shock (Pathology), Therapy), Cannulation, Electrocardiography, Blood pressure, Blood volume, Dextran, Blood plasma, Sodium compounds, Bicarbonates, Acidosis, Glucose, Electrolytes (Physiology), Oxygen, Corticosteroid agents, Cardiac glycosides.

The following procedures seem indicated in the clinical treatment of refractory noncardiac shock: (1) Placement of a central venous catheter for pressure measurements and fluid administration. ECG should be monitored. (2) Volume addition until central venous pressure reaches 15 cm. or until systemic blood pressure is normal. This should be tailored to fit the patient, using: (a) Low molecular weight or regular dextran. (b) Plasma or albumin. (c) Sodium bicarbonate or THAM. (d) Saline, balanced salt or other solutions. (e) Glucose. (3) Nasal O2 or tracheal intubation with respirator to maintain blood pO2. Most important, tracheotomy may be needed. (4) Careful administration of 1 mg./kg. of dibenzyline only if arterial pressure is still inadequate and if central venous pressure becomes elevated. (5) Corticosteroids. (6) Digitalis if there is evidence of cardiac failure. (7) Indwelling urethral catheter to monitor renal output. (8) Cool patient to normal temperature.
AD-656 828 Not available from CFSTI.

MECHANISM OF DEMYELINATION IN ALLERGIC ENCEPHALOMYELITIS OF GUINEA PIGS, AN ELECTRON MICROSCOPIC STUDY,
Armed Forces Inst of Pathology Washington D C Neuropathology Branch
Peter W. Lampert, and Marian W. Kies. 27 Feb 67, 14p
Availability: Published in Experimental Neurology v18 n2 p210-23 Jun 1967.

Descriptors: (*Nervous system diseases, Pathology), Brain, Diseases, Nerve cells, Degradation, Guinea pigs, Electron microscopy.

Allergic encephalomyelitis was induced in guinea pigs by the injection of encephalitogenic emulsions containing either human white matter or encephalitogenic protein derived from guinea pig brains. The morphology of the lesions was the same regardless of the type of antigenic mixture used to induce the disease. The lesions consisted of perivenular infiltrates of mononuclear cells. Demyelination, i.e., the selective destruction and removal of myelin sheaths without primary axonal damage, occurred within the cellular infiltrate. Lysis of myelin lamellae and stripping of myelin sheaths by invading mononuclear cells were recognized as distinct pathogenic patterns. Mononuclear phagocytes stripped the damaged sheaths off the axons by burrowing beneath the outer myelin lamellae, by penetrating between and underneath lamellae at nodes of Ranvier and by invading sheaths through gaps produced after focal myelinolysis. Secondary reactive and degenerative axonal changes frequently developed in severe lesions. (Author)
AD-656 839 Not available from CFSTI.

HYPOXIC DECOMPRESSION AND FAT EMBOLISM,
Armed Forces Inst of Pathology Washington D C
Howard E. Reidbord. 22 Aug 66, 4p
Availability: Published in Proceedings of the Society for Experimental Biology and Medicine v125 p9-12 1967.

Descriptors: (*Hypoxia, Decompression), (*Embolism, *Decompression sickness), Fats, Cholesterol, Lipids, Histology, Liver, Rabbits.

To investigate a possible relationship between fat emboli and hypoxic decompression, rabbits were exposed to simulated altitudes of 30,000 feet and 60,000 feet in a decompression chamber. Normal rabbits, cholesterol-fed rabbits, and ethionine-treated rabbits were decompressed and autopsied, and a search was made for fat emboli in the lungs. None of the animals developed a significant number of emboli compared to control animals that were similarly treated but not decompressed. These data suggest that hypoxic decompression in the rabbit will not result in the formation of fat emboli, even in the presence of fatty liver or hyperlipemia. The factors responsible for fat emboli in fatal human decompression sickness remain unclear. (Author)
AD-656 840 Not available from CFSTI.

ATROPHY OF THE ARTERIAL WALL INCIDENT TO LOCALIZED CHRONIC HYPOTENSION,
Armed Forces Inst of Pathology Washington D C Cardiovascular Pathology Branch
E. A. Husni, and William C. Manion. 15 Aug 66, 8p
Prepared in cooperation with Huron Road Hospi-

tal, East Cleveland, Ohio.
Availability: Published in Surgery v61 n4 p611-8 Apr 1967.

Descriptors: (*Hypotension, Pathology), Arteries, Cardiovascular diseases, Thrombosis, Blood pressure, Thickness, Muscles, Histology.

Atrophy of the muscle coat of arteries exposed to a chronically reduced intravascular pressure, as defined by a decrease in dry weight, nitrogen content, and thinning of the media by histologic examinations, has been observed in the popliteal artery of the dog. A minimum reduction of 10 percent of the control level in the intravascular pressure appears essential to effect detectable atrophy. It requires a minimum period of 3 weeks' exposure to this reduced intravascular pressure to initiate this change. A drop of more than 20 percent in the intravascular pressure and a duration longer than two months of this reduced pressure promote no further changes. Aside from a preliminary report regarding this subject, this is the first time that atrophy of the arterial muscle coat is reported to follow exposure of said artery to a chronically reduced intravascular pressure. (Author)
AD-656 841 Not available from CFSTI.

HETEROTOPIC SALIVARY GLAND TISSUE IN THE LOWER NECK,
Armed Forces Inst of Pathology Washington D C
Luther A. Youngs, and Henry H. Scofield. 30 Nov 66, 8p
Availability: Published in Arch. Path. v83 p548-56 1967.

Descriptors: (*Salivary glands, Pathology), Embryology, Head, Histology, Diagnosis, Infants, Adults, Etiology.

The clinical and pathologic features in 11 cases of heterotopic salivary gland tissue in the lower anterolateral neck were studied in order to define the characteristics of this rare lesion and to gain an understanding of the embryogenesis. The constant association of the salivary gland elements with sinuses, cysts, or branchial cartilages along the lower anterior border of the sternocleidomastoid (SCM) muscle suggested an association with the branchial apparatus. On the basis of location, bilateral occurrence, presence at birth, predilection for the right side of the neck, and histologic findings, it was concluded that the salivary glands had developed within remnants of the precervical sinus of His by heteroplasia. (Author)
AD-656 842 Not available from CFSTI.

ACQUIRED TOXOPLASMIC CHORIORETINITIS.
Armed Forces Inst of Pathology Washington D C
Abbot G. Spaulding, and Ramon L. Font. 1967, 9p
Availability: Published in Survey of Ophthalmology v12 n1 p16-23 1967.

Descriptors: (*Eye, Parasitic diseases), (*Toxoplasma, Diseases), Ophthalmology, Pathology, Retina, Histology, Serodiagnosis.

A case of acquired ocular toxoplasmosis in a 64-year-old woman is reported. After the organisms were identified microscopically and after the first serologic test were reported as negative, follow-up serologic tests were found to yield high titers of Toxoplasma antibodies. (Author)
AD-656 843 Not available from CFSTI.

HUMAN MALARIA,
Armed Forces Inst of Pathology Washington D C Geographic Pathology Div
Donald J. Winslow, and Daniel H. Connor. 1967, 16p
Availability: Published in Medical Times v95 n6 p593-608 Jun 1967.

Descriptors: (*Plasmodium, Diseases), Etiology, Distribution, Humans, Diagnosis, Pathology, Infections, Reticulo-endothelial system, Liver, Spleen, Bone marrow, Lymphatic system, Skin, Fats, Heart, Lungs, Placenta, Kidneys, Brain, Chemotherapy.

The following aspects of malaria are discussed: Etiology and transmission; geographic distribution; importance to man; infection; parasitologic diagnosis; pathologic effects; reticuloendothelial system; prevention; treatment and prognosis.
AD-656 844 Not available from CFSTI.

TESTICULAR TUMORS FOLLOWING ORCHIOPEXY,
Armed Forces Inst of Pathology Washington D C
James A. Dow, and F. K. Mostofi. 1967, 3p
Availability: Published in Southern Medical Journal v60 n2 p193-5 Feb 1967.

Descriptors: (*Testes, *Cancer), Surgery, Excision, Pathology, Etiology, Biopsy, Therapy.

Fourteen cases of testicular tumors following orchiopexy are presented. All of the patients had had orchiopexy at ages older than 6 years. Six years seems logically to be the maximum age for orchiopexy, according to the histology of the testicular maturation. Orchiopexy was not helpful in preventing malignancy of the testicle in this group of patients. The question of the desirability of orchiectomy rather than orchiopexy as the treatment of choice in certain cases of cryptoorchidism is raised. (Author)
AD-656 847 Not available from CFSTI.

NOSEMATOSIS: REPORT OF A CANINE CASE IN THE REPUBLIC OF SOUTH AFRICA,
Armed Forces Inst of Pathology Washington D C Geographic Pathology Div
For primary bibliographic entry see Field 2E.
AD-656 849 Not available from CFSTI

CHANGING CONCEPTS CONCERNING THE MALIGNANCY OF OCULAR TUMORS,
Armed Forces Inst of Pathology Washington D C
Lorenz E. Zimmerman. 16 Mar 67, 9p
Availability: Published in Arch. Ophthal. v78 p166-73 Aug 1967.

Descriptors: (*Eye, Neoplasms), Cancer, Ophthalmology, Pathology, Histology, Surgery, Excision.

Histopathologic studies correlated with long-term follow-up investigation have led to a change in the prognosis and management of certain ocular tumors. The relative benignancy of certain tumors of the uvea, conjunctiva, eyelid, orbit, and lacrimal gland has become widely appreciated, and efforts are being made to develop more conservative techniques in their treatment. Other tumors are being recognized as highly malignant cancers requiring early radical surgery if the patient's life is to be saved. The more enlightened management of ocular neoplasms, based on better knowledge of their biological behavior, constitutes one of the major advances that has been made in clinical ophthalmology. (Author)
AD-656 853 Not available from CFSTI.

MALIGNANT BLADDER TUMORS ASSOCIATED WITH SCHISTOSOMIASIS, A GROSS AND MICROSCOPIC STUDY,
Armed Forces Inst of Pathology Washington D C
Kamal G. Ishak, Paul C. Le Golivan, and Ismail El-Sebai. 1967, 27p
Availability: Published in Bilharzuasus p57-83 1967.

Descriptors: (*Urinary system, *Cancer), (*Schistosoma, Diseases), Surgery, Histology, Pathology, Classification, Neoplasms.

The gross and microscopic changes in 91 cases of carcinoma of the bladder associated with schistosomiasis have been presented. The ratio of males to females in this study was about 5:1. The age incidence ranged from 25 to 60 years; most of the patients were in the third, fourth and fifth decades of life. Seventy-nine of the tumors were grossly classified as fungating, 9 as infiltrative and 3 as ulcerative in type. Only two of the neoplasms were located in the region of the trigone. The remaining tumors were in the anterior wall (28 cases), posterior wall (24 cases) and superior-apical region. In twenty-eight of the cases the bladder was diffusely involved by multiple tumors. Forty-nine (53.8%) of the neoplasms were classified histologically as squamous, 35 (38.5%) as transitional and 4 (4.4%) as adenocarcinoma. There were 3 sarcomas in this series. Satellite nodules were found in ten of the bladders. The extent of invasion of the bladder wall is presented. Sixty-eight of the carcinomas extended beyond the muscularis. Twenty-five of these also showed lymph node metastases, whilst 22 showed extension to the pelvic viscera and other structures. (Author)
AD-656 854 Not available from CFSTI.

SUMMARY AND CONCLUSIONS, THE NEED FOR RESEARCH IN BILHARZIASIS,
Armed Forces Inst of Pathology Washington D C
F. K. Mostofi. 1967, 10p
Availability: Published in Bilharziasis p330-40 1967.

Descriptors: (*Schistosoma, Diseases), Penetration, Life cycle, Diagnosis, Pathology, Immunity, Infections, Urinary system, Etiology, Liver, Cardiovascular system, Intestines.
Identifiers: Bilharziasis.

The clinicopathological aspects of bilharziasis are reviewed. The need for research on this disease is emphasized.
AD-656 855 Not available from CFSTI.

VIRUS-LIKE PARTICLES IN 3-METHYLCHOLATHRENE-INDUCED PRIMARY AND TRANSPLANTED SARCOMAS OF GERM-FREE RODENTS.
Revised ed.,
Notre Dame Univ Ind Lobund Lab
Masahiro Kajima, and Morris Pollard. 9 Jan 67, 15p
Revision of manuscript submitted 15 Aug 66.
Availability: Published in Cancer Research v27 pt1 p980-93 May 1967.

Descriptors: (*Cancer, *Viruses), Transplantation, Germ-free animals, Rodents, Thymus, In vivo analysis, Electron microscopy, Steroids, Etiology.
Identifiers: Methylcholanthrenes.

Primary and serially transplanted 3-methylcholanthrene-induced sarcomas of germ-free mice and rats and the thymuses of tumor-bearing and tumor-free experimental animals were examined by electron microscopy for virus particles. The results can be summarized as follows: (a) Small doughnut-like particles (Type A) about 75 millimicrons in diameter were found mainly in association with the endoplasmic reticulum of the cell in all primary and serially passaged tumor tissues of germ-free mice, of both the C3H and AKR strain. (b) In addition, doughnut-shaped particles and particles with a large dense nucleoid (Type C), both about 100 millimicrons in diameter, were also detected in the intercellular spaces of primary and passaged tumor tissues of both the C3H and the AKR strain of mice. These Type C particles were more num-

erous in the latter mouse strain. (c) Both types of virus particles observed in the tumor tissues were also present in the thymus tissues of tumor-bearing and tumor-free mice. (d) Virus-like structures have not been noted in similarly induced tumor tissues nor in the thymuses of germ-free Sprague-Dawley, Fischer, and Wistar strain rats. The above results may indicate that the detection of virus-like particles in methylcholanthrene-induced tumors were reflections of the viral status of the experimental animals and that they probably represent 'viral contamination of the tumor tissues' in vivo. The fine structures of the basic, methylcholanthrene-induced tumor cells are described. (Author)
AD-656 857 Not available from CFSTI.

HEPARIN TREATMENT OF HAEMORRHAGIC DIATHESIS IN CYANOTIC CONGENITAL HEART-DISEASE,
Walter Reed Army Inst of Research Washington D C
James L. Stewart, Lewis H. Dennis, and Marcel E. Conrad. 1967, 4p
Availability: Published in The Lancet p1088-9 May 20 1967.

Descriptors: (*Cardiovascular diseases, Chemotherapy), Heparin, Heart, Diseases, Blood coagulation, Hemorrhage, Surgery, Thrombosis.

In 5 cases of congenital cyanotic heart-disease with secondary erythrocytosis, evidence of increased intravascular coagulation was found. This coagulation abnormality could explain the frequent thromboses and haemorrhagic phenomena observed in these patients. Identification of this coagulation defect before operation, and treatment of the defect with heparin, may be important in reducing the hazard involved in surgical repair of the cardiac defects. (Author)
AD-656 858 Not available from CFSTI.

IRON-DEFICIENT DIET: EFFECTS IN RATS AND HUMANS.
Walter Reed Army Inst of Research Washington D C
For primary bibliographic entry see Field 6P.
AD-656 861 Not available from CFSTI.

IMMUNODIAGNOSIS IN SCHISTOSOMIASIS,
Walter Reed Army Inst of Research Washington D C
Elvio H. Sadun. 1967, 12p
Availability: Published in Bilharziasis p259-69 1967.

Descriptors: (*Schistosoma, *Serodiagnosis), Diseases, Epidemiology, Immunity, Antigen-antibody reactions, Fluorescent antibody techniques, Tests, Reviews, Standardization.

A list is presented of several tests which have been developed for the immunological diagnosis of schistosomiasis.
AD-656 863 Not available from CFSTI.

N-ALKYL ALPHA CYANOACRYLATE MONOMERS AS A TISSUE ADHESIVE IN SURGERY OF INTERNAL ORGANS,
Walter Reed Army Inst of Research Washington D C
Teruo Matsumoto, K. C. Pani, Robert M. Hardaway, and Fred Leonard. 1967, 7p
Availability: Published in Military Medicine v132 n7 p515-21 Jul 1967.

Descriptors: (*Tissues (Biology), Adhesives), (*Surgical techniques, *Adhesives), Acrylic resins, Toxicity, Polymerization.

There are some situations in which the cyanoacrylate tissue adhesive may be used, advantageously, alone or in combination with conventional sutures. Development of an ideal monomer and surgical techniques suitable for the individual organs are prerequisite for clinical application. An ideal monomer must be less toxic, have higher wettability and spreadability while possessing adequate polymerization time, and it must degrade rapidly. Animal experiments indicate that the n-butyl, isobutyl and the monomer mixture of 95% heptyl-5% methyl appears to be the monomer of choice, at the present time. Various key points in surgical technique are discussed. (Author)
AD-656 866 Not available from CFSTI.

RESPONSE OF GUINEA PIG TO SUBLETHAL X-IRRADIATION AND LIVE TULAREMIA VACCINE,
Fort Detrick Frederick Md
For primary bibliographic entry see Field 6R.
AD-656 875 Not available from CFSTI.

ELECTRICAL CONDUCTIVITY, REACTION OF THE MEDIUM (pH) AND WATER CONTENT IN CEREBRAL TISSUE IN CRANIOCEREBRAL TRAUMA,
Naval Medical School Bethesda Md Translation Service
Yu. N. Orestenko. 7 Jun 67, 7p Rept no. NMS-Trans-2033
TT-67-62587
Electroprovodimost, Reaktsiya Sredy (pH) i Soderzhanie vody v Tkani Mozga pri Cherepno-Mozgovykh Travmakh, trans. of Patologicheskaya Fiziologiya i Eksperimentalnaya Terapiya (USSR). v8 p15-18 1964.

Descriptors: (*Brain, Wounds + injuries), Electrophysiology, pH, Water, Tissues (Biology), Blood analysis, Electrical conductance, Resistance (Electrical), Surgery, Head, Pathology, USSR.

Surgical craniocerebral trauma, both the primary injury and that inflicted after mild closed craniocerebral injury, results in a decrease of electroconductivity, with subsequent increase during 6 days. In case of repeated trauma to the head, as compared to the primary surgical trauma, a high acidity and a lower content of water in the brain tissue were observed. (Author)
AD-656 917 HC$3.00 MF$0.65

TRACHOMA VACCINE STUDIES IN MONKEYS,
Washington Univ Seattle Dept of Preventive Medicine
San-Pin Wang, Thomas Grayston, and E. Russell Alexander. May 67, 20p
NAMRU-2-TR-280
Grant PHS-NB-03144
Availability: Published in American Journal of Ophthalmology v63 n5 Pt2 p1615-30 May 1967.

Descriptors: (*Chlamydia trachomatis, Vaccines), Monkeys, Infections, Eye, Diseases, Immunity, Effectiveness, Viability, Purification, Toxicity.
Identifiers: TRIC agents.

Experimental monkey eye TRIC agent infection can be prevented with vaccine. A series of immunization experiments were performed using 6 TRIC strains of 4 immunologic types grown in egg yolk sac and made into vaccine by several methods. Protection against infection was found only with vaccines emulsified with oil adjuvant. Complete Fruend's or mineral oil adjuvants were about equally effective. High potency vaccines were needed for protection. Highly purified vaccines prepared by sucrose gradient centrifugation or by genetron (fluorocarbon) extraction were protective. The addition of formalin to crude or purified vaccines had no noticeable effect on potency. In one experiment vaccine was stored at 4C for one year without loss of potency. Protection from monkey eye infection was highly specific among the 4 immunologic types, as determined in mice by prevention of toxicity. The experimental infection was a vigorous test of vaccine potency. Good repetition of results was obtained when the challenge inoculum was about the minimal amount needed to infect the controls. The monkey eye infection is a good laboratory model to use for evaluating further improvements in trachoma vaccine. (Author)
AD-656 947 Not available from CFSTI.

PANNUS WITH EXPERIMENTAL TRACHOMA AND INCLUSION CONJUCTIVITIS AGENT INFECTION OF TAIWAN MONKEYS,
Washington Univ Seattle Dept of Preventive Medicine
San-Pin Wang, and J. Thomas Grayston. May 67, 17p
NAMRU-2-TR-281
Grant PHS-NB-03144
Availability: Published in American Journal of Ophthalmology v63 n5 pt2 p1133-45 May 1967.

Descriptors: (*Chlamydia trachomatis, Diseases), Eye, Monkeys, Infections, Allergy, Pathology, Vaccines, Taiwan.
Identifiers: TRIC agents.

The report discusses the reproduction in an animal model of eye disease similar to human trachoma. During a series of experiments studying the pathogenicity, prevention and treatment of monkey trachoma, 451 Taiwan monkeys (Macaca cyclopis) had 617 eye inoculations with TRIC agents which resulted in disease. Pannus developed during the course of 30 such infections in 26 monkeys. Trachomatous follicles in the tarsus, limbal follicles and Herbert's pits were all seen in some of these infections. In 2 prolonged infections with pannus, conjunctivae scars typical of trachoma progressed to cause distortion of the lids. Pannus occurred only in monkeys that had received TRIC agent vaccine (1 had received meningopneumonitis strains vaccine) and/or had had previous eye infection with TRIC agents. Pannus most frequently was associated with infection with the Bour atypical trachoma strain and the IC-Cal-3 inclusion conjuctivitis strain, but occurred only in 1 monkey of a large number inoculated with typical trachoma strains. It almost always occurred as part of a relatively severe disease and in animals with relatively high CF antibody titers. Monkeys with pannus in 1 eye usually developed pannus in the other if it was inoculated or if spontaneous cross infection occurred. It is concluded that pannus may result from infection with the inclusion conjunctivitis agent, that the host response to infection is most important in pannus formation and that hypersensitivity to homologous or heterologous TRIC agents is an important part of the host response in the pathogenesis of pannus formation. (Author)
AD-656 948 Not available from CFSTI.

HISTOPATHOLOGY OF SCHISTOSOMIASIS,
Armed Forces Inst of Pathology Washington D C
Donald J. Winslow. 1967, 13p
Availability: Published in International Academy of Pathology, Special Mono., Bilharziasis p230-41 1967.

Descriptors: (*Schistosoma, Diseases), Pathology, Morphology (Biology), Responses, Allergy, Infections, Histology, Parasitic diseases.

The histopathology of schistosomiasis is concerned with morphologic phenomena associated with alterations of the parasite (particularly its ova) and the host. The imperfection of the host-parasite relationship together with the influence of various associated factors results in a certain degree of parasite mortality. The host becomes sensitive to the presence in its tissues of toxic and foreign material and responds by production of an inflammatory defensive reaction, sometimes appearing as suppurative foci but more often seen as chronic granulomatous lesions with more or less evidence of hypersensitivity. In infections with S. japonicum and S. hematobium, many ova ap-

pear to mineralize and fail to provoke an inflammatory reaction. The histologic evidence suggests that this mineralization may tend to prevent the expected host-parasite interaction. A review of histologic sections of many cases of human schistosomiasis and the accumulated literature suggest that, in general, the host-parasite interaction particularly occurs when the parasite is poorly adapted to its anatomic situation in the host and becomes devitalized. A well adapted parasite in a suitable anatomic position within the host provokes little if any inflammatory reaction. If this were not so, the infection could not become well established. (Author)
AD-656 952 Not available from CFSTI.

UNDESIRABLE EFFECTS OF HYPNOSIS; THE DETERMINANTS AND MANAGEMENT,
Pennsylvania Hospital Philadelphia Unit for Experimental Psychiatry
For primary bibliographic entry see Field 5J.
AD-656 970 Not available from CFSTI.

WHAT MUST A SATISFACTORY THEORY OF HYPNOSIS EXPLAIN,
Pennsylvania Hospital Philadelphia Unit for Experimental Psychiatry
For primary bibliographic entry see Field 5J.
AD-656 972 Not available from CFSTI.

VECTORCARDIOGRAPHIC DIAGNOSIS USING THE POLYNOMIAL DISCRIMINANT METHOD OF PATTERN RECOGNITION.
Revised ed.,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
Donald F. Specht. 3 Aug 66, 7p
Revision of manuscript submitted 10 Jun 65.
Availability: Published in IEEE Transactions on Bio-Medical Engineering vBME-14 n2 p90-5 Apr 1967.

Descriptors: (*Cardiovascular diseases, Diagnosis), (*Electrocardiography, Pattern recognition), Accuracy, Probability density functions, Classification.

The paper describes research on the application of a newly developed pattern-recognition technique called the polynomial discriminant method (PDM) (1) to the diagnosis of heart disease as evidenced in the vectorcardiogram (an orthogonalized form of electrocardiogram). The PDM is a nonparametric statistical technique by which a pattern is classified as indicating one of several possible states of nature based on estimates of the probability density functions for each of the possible states. In this study, the PDM was applied to the classification of 312 vectorcardiograms in two categories--normal and abnormal. The PDM classification of vectorcardiograms not used for training was 97 percent correct for normal patients and 90 percent correct for abnormal patients even though a large percentage of the 'abnormal' waveforms detected by the PDM were subclinical at the time of the recording and verified to be abnormal only after subsequent tests. Although the many subcategories of abnormality must also be represented in any final solution to the problem, the recognition accuracy demonstrated in this limited experiment is definitely indicative of the potential clinical usefulness of the PDM. (Author)
AD-657 066 Not available from CFSTI.

INSULIN RESPONSE DURING TULAREMIA IN MAN,
Army Medical Unit Frederick Md
George E. Shambaugh, and William R. Beisel. Jun 67, 8p
Availability: Published in Diabetes, Journal of American Diabetes Assoc. v16 n6 p369-76 Jun 1967.

Descriptors: (*Pasteurella tularensis, Diseases), (*Infectious diseases, *Metabolism), Insulin, Glucose, Toxic tolerances, Convalescence, Blood, Blood chemistry, Responses, Diabetes, Obesity, Fevers, Inhibition, Parenteral infusions.

Serum insulin concentrations were measured serially in seven nondiabetic subjects following a rapid intravenous glucose load during a preinfection control period, during early clinical respiratory tularemia, and again in convalescence following therapy. Within twenty-four hours of onset of clinical illness the rate of glucose disappearance from the blood had diminished significantly ($p < 0.05$). At the same time there was a brisk rise in insulin levels reaching higher peak concentrations and falling more slowly than the response observed during the preinfection control period. The pattern during clinical illness was different from that described after intravenous glucose loading in maturity onset diabetes or obesity and may have been influenced by glucocorticoid excess. Increased whole blood pyruvate concentrations following glucose loading during clinical illness were compatible with heightened glucocorticoid action. The magnitude of insulin response during clinical illness was significantly increased ($p < 0.02$) and was directly related to height of fever. In contrast, the rate of glucose disappearance was inversely related to fever. The inverse relationship of the magnitude of insulin output to the rate of glucose disappearance suggested a peripheral inhibition of insulin action during infection. (Author)
AD-657 083 Not available from CFSTI.

TREATMENT OF ACUTE RADIATION INJURY UNDER MEDICALLY AUSTERE CONDITIONS,
Rochester Univ N Y
M. Ingram, W. R. Ames, C. G. Anderson, G. A. Andrews, and V. P. Bond. Apr 67, 51p Rept no. TRC-67-21
Contract OCD-PS-64-200

Descriptors: (*Radiation injuries, Therapy), Nuclear warfare casualties, Radiation sickness, Civil defense systems, Fallout shelters, Management engineering, Radioprotective agents, Diseases, Confined environments, Mortality rates, Infections, Hemorrhage, Surgery, Diagnosis, Survival.

The report summarizes the work of a committee convened to define, in light of present knowledge, the best plan for medical management of large numbers of radiation casualties under austere medical conditions and to evaluate specific courses of research which would improve our ability to cope with civil defense aspects of radiation sickness. Radiation injury is viewed as only one of a number of noxious agents which might be expected to act cumulatively or synergistically under the shelter conditions postulated. The medical significance of pre-existing disease and disability in the shelter population and the medical effects of confining large randomly selected groups of persons under the austere conditions postulated are emphasized throughout. Measures most likely to influence ultimate radiation-related mortality include management of infection and of hemorrhagic manifestations of radiation injury, and management of surgical problems. Presently available chemical 'protective agents' are mentioned but their effectiveness in preventing radiation mortality is considered to be doubtful under shelter conditions postulated. Space and water are the most important requirements for survival under shelter conditions, and present allocations should be revised. Recommendations for specific research are made but these recommendations would be subject to revision, depending upon the outcome of the recommendations with respect to operations. (Author)
AD-657 178 Not available from CFSTI.

CONSIDERATIONS UNDERLYING THE USE OF ULTRASOUND TO DETECT GALLSTONES AND FOREIGN BODIES IN TISSUE,
Naval Medical Research Inst Bethesda Md
George D. Ludwig, and Francis W. Struthers. 16 Jun 49, 30p Rept no. 4
Research supported in part by Naval Research Lab., Washington, D. C.

Descriptors: (*Ultrasonic radiation, *Diagnosis), (*Calculi, *Biliary system), Tissues (Biology), Acoustic impedance, Echo ranging, Medical examination.

The densities of a number of gallstones have been determined and found to vary between 0.82 and 1.10 gm/cc. The velocity of ultrasound through gallstone slabs, beef tissue, and living human muscles has been measured. The velocity through the gallstones varied between 1400 and 2200 m/sec. The velocity through the calf, thigh, and arm muscles of five subjects was found to vary between 1490 and 1610 m/sec with a mean value of 1540 m/sec. The mean velocity through beef tissue at 20-21C was 1540 m/sec. From these data the characteristic acoustic impedance of gallstones and of tissue was determined. Values between 130,000 and 230,000 gm/sq cm/sec were found for the gallstones measured. The acoustic impedance of tissue consisting mostly of muscle is 160,000 to 170,000 gm/sq cm/sec. The energy reflection coefficient for a gallstone in tissue was calculated, and the theoretical feasibility of detecting gallstones by the use of ultrasonic echo-ranging was established. Large signals were obtained from gallstones implanted in the back muscles and in the gallbladders of dogs. A frequency range of 1.0 and 2.5 megacycles has been found to be optimum for an ultrasonic instrument for diagnostic purposes. Penetration of soft tissues for 15 cm or more is afforded, without reaching damaging intensity levels. The wave length in tissue 0.6 to 1.5 mm. provides adequate resolution for the detection of gallstones and most foreign bodies. The possibility of detecting foreign bodies and tumors by use of the echo-ranging principle is discussed. (Author)
AD-657 255 HC$3.00 MF$0.65

VISUAL DISCRIMINATIONS OF A SUBJECT WITH ACQUIRED UNILATERAL TRITANOPIA.
Technical rept.,
Columbia Univ New York Dept of Psychology
C. H. Graham, Yun Hsia, and F. F. Stephan. 15 May 67, 12p Rept no. TR-33
Contract Nonr-266 (46)
Availability: Published in Vision Res. v6 p469-79 1967.

Descriptors: (*Color vision, Diseases), Eye, Luminescence, Retina, Ophthalmology, Visual perception.

Binocular hue matches, luminosity functions, color naming and neutral point determinations are reported in a case of acquired unilateral tritanopia. Comparisons are made with the normal vision in the patient's non-affected eye, and with predictions from data on congenital tritanopia. The affected eye shows a loss in luminosity in the region centering on the neutral point at 569 millimicrons. In all functions but luminosity the results are similar to those found in the congenital tritanope. The various implications of these findings are discussed. (Author)
AD-657 310 Not available from CFSTI.

INSTRUCTIONS TO SUPPLEMENT TEACHING ORAL HYGIENE.
School of Aerospace Medicine Brooks AFB Tex
For primary bibliographic entry see Field 6I.
AD-657 311 HC$3.00 MF$0.65

ALLERGY AND SINUS DISEASE IN AVIATORS.
Technical rept. Dec 60-Jul 65,
School of Aerospace Medicine Brooks AFB Tex
Frederick G. Collins, and Morgan E. Wing. May 67, 12p Rept no. SAM-TR-67-47

Descriptors: (*Aviation medicine, *Otorhinolaryngology), Allergy, Paranasal sinuses, Diseases, Diagnosis, Aviation personnel.

The paper covers all aeromedical consultation cases seen at the USAF School of Aerospace Medicine during the period December 1960 to July 1965. This study is concerned primarily with the occurrence of nasal allergy and chronic sinus disease in aviators. Evaluation of the history as given by the patient, diagnosis of the disease (allergy or sinusitis) present, and a comparison between incidence of cases in both disease areas are presented. Age and flying time in both jet and reciprocal aircraft were not found to be significantly related to the incidence of chronic sinusitis. (Author)
AD-657 312 HC$3.00 MF$0.65

INFECTION OF PREGNANT MONKEYS AND THEIR OFFSPRING WITH TRIC AGENTS,
Naval Medical Research Unit No 2 Taipei (Taiwan)
For primary bibliographic entry see Field 6M.
AD-657 497 Not available from CFSTI.

MOSQUITO-INDUCED INFECTION WITH EQUINE ENCEPHALOMYELITIS VIRUS IN DOGS,
Army Medical Unit Frederick Md
W. S. Bivin, C. Barry, A. L. Hogge, Jr., and E. C. Corristan. 1967, 4p
Availability: Published in American Journal of Tropical Medicine and Hygiene v16 n4 p544-7 1967.

Descriptors: (*Venezuelan equine encephalomyelitis virus, Diseases), Aedes, Infections, Dogs, Antigens + antibodies, Serodiagnosis.

Dogs infected with Venezuelan equine encephalomyelitis virus via the bite of infected Aedes triseriatus responded with fever and hemagglutination-inhibiting antibodies. Even though high temperatures were elicited in 14 of the animals, in only seven did viremia develop above 10 to the 2.5 power mouse intraperitoneal median lethal dose 50 per ml. Sufficient quantities of mosquitoes were infected from the dogs to permit passage of the virus on to guinea pigs. There were no other clinical signs of illness observed in the animals. (Author)
AD-657 508 Not available from CFSTI.

A PROSPECTIVE LOOK AT MEDICAL PROBLEMS FROM HAZARDS OF SPACE OPERATIONS.
Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
For primary bibliographic entry see Field 6S.
For abstract, see STAR 05 19.
N67-32905 HC$3.00 MF$0.65

ASSIST IN ACCOMPLISHING THE TRANSFER OF APPLICABLE SCIENCE AND TECHNOLOGY FROM N A S A'S R+D PROGRAM INTO THE BIO-MEDICAL FIELD QUARTERLY PROGRESS REPORT, 1 MAR.-31 MAY 1967.
Southwest Research Inst., San Antonio, Tex.
L. S. Berger, and R. W. Ware. 31 May 67, 92p
NASA-CR-86990, QPR-3
Contract NASR-94/09/

Descriptors: *Aerospace technology, *Biology, *Medicine, Aerospace, Data, Instrumentation, Technology, Transmission, University program.

For abstract, see STAR 05 19.
N67-32906 HC$3.00 MF$0.65

6F. Environmental Biology

EFFECT OF ENVIRONMENTAL TEMPERATURE ON FATTY LIVERS PRODUCED BY VARIOUS HEPATOTOXIC AGENTS IN RATS.
Defence Research Medical Labs Toronto (Ontario)
For primary bibliographic entry see Field 6A.
AD-656 834 Not available from CFSTI.

SURVIVAL OF SELECTED MICROORGANISMS IN HIGH ULTRAVIOLET FLUX.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. W. Mardres. Dec 66, 12p NASA-TM-X-55853, X-624-66-189

Descriptors: *Mars surface, *Microorganism, *Radiation effect, *Survival, *Ultraviolet radiation, Actinomycetes, Bacteria, Bibliography, Biology, Death, Effect, Exposure, Flux, Fungus, Genetics, Growth, High, Lamp, Lethality, Logarithm, Mars (planet), Mutation, Order, Protection, Radiation, Space, Surface, Ultraviolet, Yeast.

For abstract, see STAR 05 19.
N67-33408 HC$3.00 MF$0.65

6G. Escape, Rescue, and Survival

EFFECTS UPON TANK CREWS OF SEVERAL METHODS OF PROTECTION AGAINST CHEMICAL WARFARE AGENTS.
Army Medical Research Lab Fort Knox Ky
For primary bibliographic entry see Field 15B.
AD-657 227 HC$3.00 MF$0.65

A PROTECTIVE PASSENGER SMOKE HOOD,
Civil Aeromedical Inst Oklahoma City Okla
For primary bibliographic entry see Field 6Q.
AD-657 436 HC$3.00 MF$0.65

6H. Food

MOISTURE EQUILIBRIUM IN RELATION TO THE CHEMICAL STABILITY OF DEHYDRATED FOODS: A BIBLIOGRAPHY,
Army Natick Labs Mass Technical Library
Eugene G. Beary. Jan 67, 146p Rept no. Bibliographic-67-1

Descriptors: (*Dehydrated foods, Bibliographies), Moisture, Equilibrium, Stability, Storage, Freeze drying, Abstracts.

A bibliography is presented with abstracts of 380 references on moisture equilibrium in relation to the chemical stability of dehydrated foods. Author and detailed subject indexes are provided. (Author)
AD-656 927 HC$3.00 MF$0.65

6I. Hygiene and Sanitation

INSTRUCTIONS TO SUPPLEMENT TEACHING ORAL HYGIENE.
Aeromedical reviews,
School of Aerospace Medicine Brooks AFB Tex
Timothy J. O'Leary, and Claude L. Nabers. Jun 67, 21p Rept no. Review-3-67

Descriptors: (*Hygiene, Mouth), Dentistry, Instruction manuals, Teeth.

The booklets was prepared to instruct patients on oral hygiene procedures. It was designed to complement, not take the place of, chair-side teaching. The section 'Personal Recommendations for Your Mouth' at the end of the booklet, permits the clinician to prescribe for particular situations or areas. Using the booklet as a daily guide, the patient more quickly attains a high degree of proficiency in oral hygiene, and less of the clinician's time is required for chair-side instruction.
AD-657 311 HC$3.00 MF$0.65

6K. Life Support

BEHAVIORAL CHANGES IN RATS AT GROUND LEVEL FOLLOWING GESTATION AND GROWTH IN 100% OXYGEN AT REDUCED PRESSURES.
Final rept. Mar 66-Jan 67,
School of Aerospace Medicine Brooks AFB Tex
Julian P. Cooke, and William E. Pepelko. Jun 67, 11p Rept no. SAM-TR-67-50

Descriptors: (*Respiration, *Life support), Adaptation (Physiology), Barometric pressure, Pressure breathing, Oxygen, Toxicity, Behavior, Air, Rats.

After removal from a hypobaric normoxic environment (an altitude chamber containing 97% O2 at a total pressure of 210 torr or 210 mm. Hg, absolute), exploratory activity of rats conceived, born, and raised in such an environment was measured from photographic light tracings made during the animals' movements. Within 15 minutes after the first encounter with room air at ground level, experimental animals displayed more exploratory activity than ground-level controls. No differences were measured 4 hours later, but a reduced amount of exploratory behavior occurred after 1 day's exposure to room air at ground level. The extra amount of work necessary to ventilate the lungs owing to increased turbulence in the more dense air at ground level is believed to result in initial excitement and hyperactivity, followed by a reduction in movement as tiring occurs. Adaptation to room air at ambient pressures has apparently not been completed within 22 hours following a previous growth to maturity in a hypobaric normoxic environment. (Author)
AD-657 029 HC$3.00 MF$0.65

MINERAL NUTRIENT REQUIREMENTS OF CHLORELLA SORKINIANA IN CONTINUOUS PURE CULTURE.
Monsanto Research Corp Dayton Ohio Dayton Lab
For primary bibliographic entry see Field 6A.
AD-657 031 HC$3.00 MF$0.65

A DETAILED STUDY OF CONTAMINANTS PRODUCED BY MAN IN A SPACE CABIN SIMULATOR AT 760 MM. HG FINAL REPORT.
School of Aerospace Medicine, Brooks AFB, Tex.
J. D. Adams, J. P. Conkle, W. E. Mabson, B. E. Welch, and H. J. Zeft. Mar 67, 149p NASA-CR-87451, SAM-TR-67-16
NASA ORDER R-89

Descriptors: *Man, *Space cabin simulator, *Trace contaminant, Analysis, Cabin, Carbon dioxide, Carbon monoxide, Cell, Chromatography, Closed, Contaminant, Cryogenics, Ecology, Environment, Gas, Infrared, Mass, Medicine, Pressure, Seal, Simulator, Space, Spectroscopy, System, Test, Trace.

For abstract, see STAR 05 19.
N67-33837 HC$3.00 MF$0.65

6L. Medical and Hospital Equipment

THE SLIDE,
Armed Forces Inst of Pathology Washington D C
Bruce H. Smith. 1967, 7p
Availability: Published in Annals of the New York Academy of Sciences v142 n2 p440-5 Mar 31 1967.

Descriptors: (*Photographic film, Medicine), Training devices, Color film, Pathology.

The slide, if properly used, has many strengths in the field of biomedical communication, in both in-house training and in reaching those individuals who are unable to come to formal lectures. (Author)
AD-656 845 Not available from CFSTI.

METHODS OF PROTECTION AGAINST FLASH BURNS.
Army Medical Research Lab Fort Knox Ky
For primary bibliographic entry see Field 6U.
AD-657 231 HC$3.00 MF$0.65

6M. Microbiology

POPULATION DYNAMICS AND RESULTS OF FLUCTUATION TESTS IN A STUDY OF THE ROLE OF ATABRINE AS AN ANTIMUTAGEN IN PREVENTING STREPTOMYCIN RESISTANCE IN STAPHYLOCOCCUS AUREUS,
Pennsylvania Univ Philadelphia Dept of Surgery
Samuel J. De Courcy, Jr., and M. G. Sevag. 1967, 10p
Grant PHS-AI-05473
Prepared in cooperation with Philadelphia General Hospital, Pa. Dept. of Clinical Pathology and Veterans Administration Hospital, Philadelphia, Pa.
Availability: Published in Antimicrobial Agents and Chemotherapy, p235-44 1966.

Descriptors: (*Streptomycins, Resistance (Biological)), (*Staphylococcus aureus, Resistance (Biological)), Cinchona alkaloids, Growth, Desoxyribonucleic acids, Culture media.

Previous studies showed that a combination of streptomycin and Atabrine blocks the emergence of streptomycin-resistant strains from normal populations. Streptomycin-resistant strains, conversely, survive and multiply in this system. With a view toward resolving the controversial question of whether or not drug-resistant cells are pre-existent in normal bacterial populations, and whether their selection accounts for the development of resistance, this highly sensitive differential test was combined with (i) the random fluctuation test and (ii) the Lederberg replica plating technique. Sister colonies of Staphylococcus aureus obtained by Lederberg replication from plates containing streptomycin-free and streptomycin-containing agar were tested in broth systems containing 100 micrograms of streptomycin per ml with and without Atabrine. The results suggest that (i) a normal population does not contain cells comparable to de facto antibiotic-resistant forms, (ii) replica sister colonies grown on media with and without streptomycin differ with respect to streptomycin resistance, and (iii) only cells possessing the 'potential' are triggered to bona fide resistance by the action of an antibiotic. (Author)
AD-656 813 Not available from CFSTI.

ADIASPIROMYCOSIS IN SMALL MAMMALS OF NEW MEXICO,
Walter Reed Army Inst of Research Washington D C
For primary bibliographic entry see Field 6C.
AD-656 869 Not available from CFSTI.

TRACHOMA VACCINE STUDIES IN MONKEYS,
Washington Univ Seattle Dept of Preventive Medicine
For primary bibliographic entry see Field 6E.
AD-656 947 Not available from CFSTI.

COMPARATIVE LIPID COMPOSITION OF PSITTACOSIS AND TRACHOMA AGENTS,
Technical rept.,
Washington Univ Seattle Dept of Preventive Medicine
Howard M. Jenkin. 1967, 16p
NAMRU-2-TR-285
Grants NIH-NB-03144, Nonr (G)-00034-64
Availability: Published in American Journal of Ophthalmology v63 n5 pt2 p1087/61-1098/72 May 1967.

Descriptors: (*Chlamydiaceae, Lipids), Miyagawanella psittaci, Chlamydia trachomatis, Phospholipids, Fatty acids, Chromatographic analysis, Miyagawanella louisianae, Identification, Ophthalmology.
Identifiers: Psittacosis-lymphogranuloma venereum-trachoma, TRIC agents.

The results suggest that it is possible to distinguish members of the psittacosis group of agents from host materials on the basis of their phospholipid and fatty acid components. Gas-liquid chromatography (GLC) of unhydrogenated methyl esters of fatty acids obtained from the phospholipid fraction of these agents were very similar. When hydrogenated methyl esters were examined, the fatty acids of 6BC and meningopneumonitis agents were different from each other and from host material. A large number of odd-numbered, unsaturated fatty acids seem to be present in these agents including a C17:1 compound which has been associated primarily with bacteria. Two-dimensional thin-layer chromatography (TLC) was used to characterize the phospholipids of TW-3, 6BC and meningopneumonitis agents of the PLT group of agents. The phospholipid patterns of the 3 agents were quite similar. One unidentified phospholipid species was found in the meningopneumonitis agent but was a minor component or absent in the other agents. Phosphatidyl choline, phosphatidyl ethanolamine, sphingomyelin, phosphatidyl serine and phosphatidic acid were found and identified by their chromatographic behavior in the PLT. (Author)
AD-657 493 Not available from CFSTI.

INFECTION OF PREGNANT MONKEYS AND THEIR OFFSPRING WITH TRIC AGENTS,
Naval Medical Research Unit No 2 Taipei (Taiwan)
E. Russell Alexander, and Wen Tsuo Chiang. May 67, 13p Rept no. NAMRU-2-TR-284
Availability: Published in American Journal of Ophthalmology, v63 n5 Pt. II p1145/120-53/127 May 1967.

Descriptors: (*Chlamydiaceae, Infections), Monkeys, Pregnancy, Reproductive system, Infants, Eye, Diseases, Chlamydia trachomatis, Ophthalmology.
Identifiers: Psittacosis - lymphogranuloma venereum-trachoma, TRIC agents.

An attempt was made to develop an experimental model in monkeys of the maternal-infant infection with TRIC agent in humans, producing follicular cervicitis in the mother and inclusion conjunctivitis in the infant. In 20 attempts to infect monkey cervix, 4 monkeys have been infected as evidenced by recovery of TRIC agent one or more times from the cervix. All recovery has been in the first 3 weeks after inoculation. Nine pregnant monkeys were inoculated in the cervix with TRIC agents, twice during the latter half of pregnancy, and once post-partum. None developed significant cervicitis when compared with 4 placebo-inoculated controls. None of the 9 infant monkeys born to TRIC-inoculated mothers developed significant conjunctivitis, when compared to the 4 infants of placebo-inoculated mothers, and TRIC agents were not recovered from scrapings of the eyes, nor were inclusions seen on smear. At about 7 months of age, all infant monkeys were challenged in the right eye with TRIC agents (Bour, IC-Cal-3 or GB-IOL-15 strains were used). All infants developed follicular conjunctivitis. Six of 9 infants born of TRIC agent-inoculated mothers developed severe follicular conjunctivitis with pannus. None of the 4 infants born of placebo-inoculated mothers developed severe follicular conjunctivitis. Because pannus formation and follicular conjunctivitis of this severity is never seen in initial experimental trachoma infection of monkeys, it is assumed that 6 of 9 infant monkeys had inapparent infection with TRIC agent resulting in their sensitization to re-challenge. It is probable that this occurred in passage through an infected cervix. (Author)
AD-657 497 Not available from CFSTI.

A POTENCY TEST FOR TRACHOMA VACCINE UTILIZING THE MOUSE TOXICITY PREVENTION TEST,
Washington Univ Seattle Dept of Preventive Medicine
San-Pin Wang, and J. Thomas Grayston. 1967, 16p
NAMRU-2-TR-283
Grant PHS-NB-03144
Availability: Published in American Journal of Ophthalmology v63 n5 pt-2 p1443-57 May 1967.

Descriptors: (*Chlamydia trachomatis, Vaccines), Viability, Toxicity, Toxins + antitoxins, Immunity, Antigens + antibodies, Purification, Mice, Effectiveness.
Identifiers: TRIC agents.

A quantitative modification of the mouse toxicity prevention test is described for potency assay of trachoma vaccine. The method of toxicity titration of toxin was revised. Closely spaced dilutions (3:4) of infected yolk sac suspension (ranging from 5% to 30%) were intravenously titrated in mice. The 50% end-point of lethality (LD50) was obtained and the results of titrations were reproducible. The age and weight of mice were critical to reproducible titration. Using this titration method, thermostability of toxin was investigated. Toxin was rapidly inactivated within five minutes at 56C, but was stable for days at the refrigerator temperature of 2C-5C, and apparently stable for several months at -65C. Although toxin was found to be labile, either live (DEAF-Sephadex purified) or killed (trypsin-genetron-sucrose gradient purified) organisms were effective immunizing antigens. A quantitative measurement of protecting antigen was devised. Protection was demonstrated without much loss three weeks after the intravenous immunization. In a parallel test, killed (genetron purified) and live (sucrose-gradient purified) preparations of vaccine derived from the same infected yolk sac materials were shown to be equally protective in the quantitative test. This potency test has been used for evaluation of purification methods for vaccine. (Author)
AD-657 499 Not available from CFSTI.

FURTHER CLASSIFICATION OF TRIC AGENTS FROM OCULAR TRACHOMA AND OTHER SOURCES BY THE MOUSE TOXICITY PREVENTION TEST,
Washington Univ Seattle Dept of Preventive Medicine
E. Russell Alexander, San Pin Wang, and J. Thomas Grayston. 1967, 14p
NAMRU-2-TR-282
Grant PHS-NB-03144
Availability: Published in American Journal of Ophthalmology v63 n5 pt-2 p1469-78 May 1967.

Descriptors: (*Chlamydiaceae, Classification), Chlamydia trachomatis, Reproductive system, Eye, Diseases, Toxicity, Urinary system, Mice, Ophthalmology.
Identifiers: TRIC agents.

The mouse toxicity prevention test was used to examine antigenic relationships of 50 TRIC agent strains from various countries and various sites. These results are combined with previous reports from the laboratories to result in classification of 80 TRIC agents. Sixty-two of 64 agents recovered from cases of ocular trachoma fall into 1 of 3 antigenically distinct types. Type A is characterized by SA-1 or G-17 strains, type B by TW-1 or TW-5 strains, and type C by TW-3 or ND-3 strains.

All of 16 strains recovered from sources other than ocular trachoma and 2 strains recovered from clinical trachoma fall into 3 distinct types: D (G-1 prototype), E (Bour prototype), and F (IC-Cal-3 prototype). These strains were recovered from inclusion conjunctivitis of infancy, from female cervix, from male urethra, and from 1 eye with punctate keratitis. They were recovered in London, San Francisco, Seattle and Taipei. Five other strains received in this laboratory from 4 cases with a typical conjunctivitis in Adelaide and from the joint fluid in Reiter's syndrome in London do not fit into any of the 6 mouse prevention types and share other biologic properties which differentiate them from classical TRIC agents. (Author)
AD-657 500 Not available from CFSTI.

MOSQUITO-INDUCED INFECTION WITH EQUINE ENCEPHALOMYELITIS VIRUS IN DOGS.
Army Medical Unit Frederick Md
For primary bibliographic entry see Field 6E.
AD-657 508 Not available from CFSTI.

DETECTION OF EXTRATERRESTRIAL MICROORGANISMS BY MICROCALORIMETRY FINAL REPORT.
Beckman Instruments, Inc., Fullerton, Calif. Advanced Technology Operations.
For primary bibliographic entry see Field 6C.
For abstract, see STAR 05 19.
N67-33255 HC$3.00 MF$0.65

6N. Personnel Selection and Maintenance (Medical)

INCIDENCE OF EAR, NOSE, AND THROAT DISEASES IN 400 SPACE AND TEST PILOT CANDIDATES.
Technical rept. 1 Aug 63-1 Aug 65,
School of Aerospace Medicine Brooks AFB Tex
William L. Mitchell, Morgan E. Wing, and Frederick G. Collins. May 67, 22p Rept no. SAM-TR-67-45

Descriptors: (*Aviation medicine, *Otorhinolaryngology), Ear, Nose, Throat, Diseases, Pilots, Medical examination, Selection, Astronauts.

The incidence of past and present ear, nose, and throat diseases derived from comprehensive evaluation of 400 space and test pilot candidates is reported. Comparisons are made between several items of past medical history, findings from physical examinations, and results of specialized examinations. The data presented provide useful information in the medical selection of space pilot candidates and an opportunity to study the results of longitudinal aeromedical screening. Additionally, the possible relationship between asymptomatic ear, nose and throat diseases in flying personnel and such factors as age, flying time, history, and results from examinations is discussed. (Author)
AD-657 030 HC$3.00 MF$0.65

THE PERFORMANCE OF THE FARNSWORTH LANTERN AT THE SUBMARINE MEDICAL RESEARCH LABORATORY AND IN THE FIELD FROM 1955 TO 1965,
Naval Submarine Medical Center Groton Conn
Submarine Medical Research Lab
Helen M. Paulson. 19 Jan 66, 30p Rept no. SMRL-466

Descriptors: (*Color vision, Tests), Reliability, Naval personnel, Selection, Medical examination, Errors.

The Farnsworth Lantern is a color vision test which presents specially selected pairs of red, green, and white lights. It was developed for Naval use by the late CDR Dean Farnsworth, MSC, USNR, when he was attached to the Submarine Medical Research Laboratory. Whereas the set of pseudo-isochromatic plates which is the other color vision test commonly used by the Navy was designed to pass normals and fail all color defectives, the Farnsworth Lantern was designed to pass normals and the mild color defectives and to fail the moderate, severe, and dichromatic color defectives. Good color vision is required for acceptance to many Naval training schools because, upon completion of the training, the man will be called upon to make critical color judgments as part of his Naval duties. When plates were used as the qualifying color vision test for acceptance to these schools, all color defectives - ten per cent of the applicants - were rejected (when the plates were correctly administered). With the introduction of the FaLant as a qualifying test, thirty per cent of the color defective population is being salvaged, (that is the FaLant passes three of the ten men in a hundred who are color defective) by rating them as safe for making accurate color judgments. This Farnsworth Lantern has been in use at the Submarine Medical Research Laboratory and at various Naval activities, such as hospitals, training schools, air stations, et cetera, for some ten years. The paper analyzes its performance here at SMRL and in the field during this period (1955 - 1965). (Author)
AD-657 059 HC$3.00 MF$0.65

MULTIFOCAL PREMATURE CONTRACTIONS, AN ECG FINDING OF GRAVE SIGNIFICANCE,
School of Aerospace Medicine Brooks AFB Tex
Internal Medicine Branch
Philip R. Akre. Feb 67, 9p
SAM-TR-66-276
Availability: Published in Aerospace Medicine v38 n2 p197-201 Feb 1967.

Descriptors: (*Cardiovascular diseases, *Aviation personnel), (*Aviation medicine, *Electrocardiography), Stress (Physiology), Pilots, Heart, Diseases, Tolerances (Physiology).

Evaluation of the cardiovascular system is important in determining an individual's ability to tolerate the stresses of flying. The electrocardiogram is an essential part of the cardiovascular evaluation. A case is presented of a USAF pilot of 19 years whose routine electrocardiogram demonstrated multifocal premature ventricular contractions. This man was thoroughly evaluated at the School of Aerospace Medicine and ultimately removed from flying duties. One year later, this individual expired suddenly as the result of ventricular fibrillation. Autopsy revealed diffuse severe interstitial fibrosis of the left ventricle. The demonstration of multifocal premature ventricular contractions is a grave finding. The frequency of this finding and its significance in flying personnel is discussed. (Author)
AD-657 219 Not available from CFSTI.

6O. Pharmacology

POPULATION DYNAMICS AND RESULTS OF FLUCTUATION TESTS IN A STUDY OF THE ROLE OF ATABRINE AS AN ANTIMUTAGEN IN PREVENTING STREPTOMYCIN RESISTANCE IN STAPHYLOCOCCUS AUREUS,
Pennsylvania Univ Philadelphia Dept of Surgery
For primary bibliographic entry see Field 6M.
AD-656 813 Not available from CFSTI.

THE INFLUENCE OF METHIMAZOLE ON THE CATECHOLAMINE EXCRETION OF COLD-STRESSED RATS,
Toronto Univ (Ontario) Dept of Pharmacology
For primary bibliographic entry see Field 6S.
AD-656 836 Not available from CFSTI.

AN EXCITATORY ADRENERGIC ALPHA RECEPTOR MECHANISM OF TERMINAL GUINEA-PIG ILEUM,
Walter Reed Army Inst of Research Washington D C
For primary bibliographic entry see Field 6P.
AD-656 859 Not available from CFSTI.

THE FATE OF DIMETHYL SULFOXIDE APPLIED TO THE SKIN OF THE RAT,
Defence Chemical Biological and Radiation Labs Ottawa (Ontario)
H. L. McDermot, A. J. Finkbeiner, and B. Zanette. 4 Oct 66, 5p Rept no. DCBRL-525
Availability: Published in Canadian Journal of Physiology and Pharmacology v45 p475-8 1967.

Descriptors: (*Drugs, Absorption (Biological)), Toxicity, Skin, Penetration, Sulfoxides, Tissues (Biology), Dosage, Excretion, Urine, Canada.
Identifiers: Dimethyl sulfoxide.

Dimethyl sulfoxide (DMSO) applied to the skin of the rat has been shown to be more than 90% absorbed with evaporative losses of less than 1%. Following absorption, it was found in the following selected tissues: brain, muscle, kidney, lung, liver, heart, and blood. Peak concentrations in all the tissues were found 1.5 to 2 h after administration of DMSO. The highest concentration was observed in the kidney. Approximately 85% of the applied dose was excreted unchanged in the urine in 24 h. (Author)
AD-656 944 Not available from CFSTI.

PREVENTION OF ANAPHYLACTIC DEATH IN THE MOUSE TOXICITY PREVENTION TEST FOR TRIC AGENTS,
Washington Univ Seattle Dept of Preventive Medicine
For primary bibliographic entry see Field 6C.
AD-656 946 Not available from CFSTI.

TRACHOMA VACCINE STUDIES IN MONKEYS,
Washington Univ Seattle Dept of Preventive Medicine
For primary bibliographic entry see Field 6E.
AD-656 947 Not available from CFSTI.

IMMUNOLOGIC EVALUATION OF DIMETHYL SULFOXIDE.
Final rept.,
Wilford Hall Hospital (Air Force) Lackland AFB Tex
Andrew M. Hegre, and Robert E. Smith. Jun 67, 10p
AMLC-TR-67-4

Descriptors: (*Sulfoxides, Antigen-antibody reactions), Immunity, Allergy, Serum albumin, Skin, Toxicity, Transport properties, Immunology.
Identifiers: Dimethyl sulfoxide.

Reports in the literature indicated that dimethyl sulfoxide (DMSO) seemed to permit the passage through the skin of extremely large molecular-size particles. Each day for 42 days, 5 cubic centimeters of a mixture of a 100 per cent solution of DMSO and an equal part of a bovine serum albumin solution were applied to the shaved backs of five rabbits. Sera drawn at 14, 28 and 49 days were studied for evidence of precipitating antibody, and the precipitates were evaluated for total nitrogen content. In addition, 10 patients from the Allergy Clinic of Wilford Hall USAF Hospital and with a clinical history of inhalant allergic disease as well as positive skin tests by the conventional technique were selected for study. They were given drop skin tests on the back with 50 per cent DMSO and a 1:40 antigen concentration. No evidence of skin toxicity was found with the use of a 50 per cent DMSO concentration in the animals

or the humans. Therefore, consideration should be given to the potential use of DMSO as an antigen carrier vehicle. (Author)
AD-657 022 HC$3.00 MF$0.65

STUDIES RELATED TO AN EARLY DETECTION OF TOXIC EFFECTS OF ORGANIC CHEMICALS.
Kansas Univ Lawrence
For primary bibliographic entry see Field 6T.
AD-657 252 HC$3.00 MF$0.65

6P. Physiology

THE EFFECT OF REPEATED HEAT AND COLD EXPOSURE ON SERUM PROTEIN COMPOSITION IN MAN,
Army Research Inst of Environmental Medicine Natick Mass
For primary bibliographic entry see Field 6S.
AD-656 821 Not available from CFSTI.

HUMAN BODY DENSITY AND FAT OF AN ADULT MALE POPULATION AS MEASURED BY WATER DISPLACEMENT,
Army Medical Research and Nutrition Lab Denver Colo
H. J. Krzywicki, and K. S. Chinn. 1967, 7p
Availability: Published in The American Journal of Clinical Nutrition v20 n4 p305-10 Apr 1967.

Descriptors: (*Body, Volume), Density, Males, Body weight, Lipids, Aging (Physiology), Measurement.

Body volume was measured on 14 male adults at 7 intervals during a 24-hr period using a water-displacement technique. The variation in body densities fell within the accepted limits of error propagated by the technique. Body densities were also performed on 173 male adults ranging between the ages of 17-69. Values were effectively ranked in terms of age and body fat, demonstrating a continued increase in body fat with an increase in age. These values were independent of body weight. The human body volumeter is a simple, rapid, and effective device which compares favorably with the underwater weighing technique for estimating body density in large populations. The precision for estimating body fat is plus or minus 0.488 kg when the residual lung volume is measured but is reduced to plus or minus 1.52 kg when the volume is estimated. (Author)
AD-656 856 Not available from CFSTI.

AN EXCITATORY ADRENERGIC ALPHA RECEPTOR MECHANISM OF TERMINAL GUINEA-PIG ILEUM,
Walter Reed Army Inst of Research Washington D C
David G. Reynolds, Gale E. Demaree, and Melvin H. Heiffer. 16 Dec 66, 6p
Availability: Published in Proceedings of the Society for Experimental Biology and Medicine v125 p73-8 1967.

Descriptors: (*Intestines, Chemoreceptors), Sympatholytic agents, Epinephrine, Levarterenol, Responses, Guinea pigs.

Experiments were performed on segments of terminal guinea-pig ileum utilizing differential alpha and beta adrenergic receptor site blocking techniques. Phenylephrine caused a contraction of this segment of guinea-pig intestine which resembled a pure alpha receptor site response. Both epinephrine and noreinephrine produced biphasic responses which follow a pattern of alpha excitation followed by beta inhibition while isoproterenol elicited a pure beta inhibitory action. The use of phenoxybenzamine as an alpha blocking agent abolished all excitatory responses while augmenting beta actions. Propranolol, through beta adrenergic receptor site blockade, potentiated alpha excitatory actions. The results are discussed in terms of the guinea-pig terminal ileum possessing a unique alpha adrenergic receptor mechanism which is excitatory in nature. (Author)
AD-656 859 Not available from CFSTI.

IRON-DEFICIENT DIET: EFFECTS IN RATS AND HUMANS.
Revised ed.,
Walter Reed Army Inst of Research Washington D C
Richard M. Kaufman, Simeon Pollack, and William H. Crosby. 26 Mar 66, 13p
Revision of manuscript submitted 2 Dec 65.
Availability: Published in Blood v28 n5 p726-37 Nov 1966.

Descriptors: (*Deficiency diseases, Iron), Diet, Absorption (Biological), Erythrocytes, Hemopoietic system, Hemorrhage, Rats, Humans.

Iron absorption in rats is increased by dietary iron deprivation. Erythropoiesis in the rat is unaffected by dietary iron deprivation that increases iron absorption by more than a factor of four. Iron absorption is not increased in rats bled of an amount of iron equivalent to that lost in 5 days of iron deprivation. These findings are compatible with the concept that iron-absorption is controlled by depletion of iron from a specific pool, separate from the hepatic and erythrocytic iron pools. Iron absorption in human subjects was unaffected by dietary iron deprivation for 13 days. Reasons for differences between human and rat results are discussed. (Author)
AD-656 861 Not available from CFSTI.

COOLING AT -10C AS AN INDEX OF COLD ACCLIMATION IN WHITE MICE.
Defence Research Medical Labs Toronto (Ontario)
For primary bibliographic entry see Field 6C.
AD-656 878 Not available from CFSTI.

MECHANORECEPTORS,
Naval Medical School Bethesda Md Translation Service
O. B. Ilinskii. 28 Jun 67, 99p Rept no. NMS-Trans-2034
TT-67-62583
Mekhanoreteptory, trans. of mono. Voprosy Fiziologii Sensornykh System, Leningrad, 1967 82p.

Descriptors: (*Sensory mechanisms, Electrophysiology), Nervous system, Stimulation, Nerve cells, Responses, Nerve impulses, Regeneration, Nerve fibers, Adaptation (Physiology), Inhibition, Muscles, Acetylcholine, Epinephrine, Chemoreceptors, Anesthetics, Histology, Sensitivity, Reviews, USSR.

An attempt is made to review in detail studies on mechanoreceptors, and in the light of these data, to discuss certain general principles in the organization and in the functioning of these sensory structures.
AD-656 918 HC$3.00 MF$0.65

STATISTICAL MECHANISMS IN GENERATION OF THE EEG,
California Univ Los Angeles Brain Research Inst
Rafael Elul. 1967, 21p
AFOSR-67-1872
Contract AF 49 (638)-1387, Grant PHS-NB-1883
Availability: Published in Unidentified Journal 21p nd.

Descriptors: (*Electroencephalography, Nerve cells), Electrophysiology, Electrodes, Nerve impulses, Statistical tests, Statistical processes.

The paper is concerned with the relationship between transmembrane oscillations in individual nerve cells and the EEG. Sensitive statistical tests were employed to explore the nature of this relationship. The over-all character of the two activities is quite similar (and, indeed, the frequency spectra of the EEG and neuronal waves are closely related); nevertheless, analysis of intracellular recordings indicates that nerve cells do not maintain any constant phase relation to the EEG. A linear relationship between any given cell and the gross EEG could be found only rarely, the general rule being absence of linear interdependence. It was also shown that the gross EEG has a normal (Gaussian) amplitude distribution, whereas the activity of individual neurons is distributed in a non-Gaussian fashion. This evidence is most compatible with an explanation of the EEG as the random sum of nonlinearly related (and possibly almost totally independent) generators. (Author)
AD-656 975 Not available from CFSTI.

FIXED CHARGE IN THE CELL MEMBRANE,
California Univ Los Angeles Brain Research Inst
R. Elul. 22 Mar 66, 17p
AFOSR-67-1870
Contract AF 49 (638)-1387
Availability: Published in Journal Physiol. v189 p351-65 1967.

Descriptors: (*Electrophysiology, *Cells (Biology)), Electric fields, Nerve cells, Muscles, Connective tissue, Cancer, Erythrocytes, Membranes (Biology), Culture media, Tissue culture cells, Electric currents, Electroosmosis.

Focal electric field was generated by passing a current of 5 x 10 to the minus 7th power to .00001 A from a micropipette into the culture medium. Movement of cells at a distance of 5-50 microns from the electrode tip was observed. In case of cells embedded in the culture only local deformation of the membrane was observed. The cell species explored included neurones, glia, muscle fibres, connective cells, malignant cells and erythrocytes. All cells responded in a similar manner to the elctric field, and the current required was in the same range. Cells were attracted to a positive micropipette and repelled from a negative one: the only exception was observed in certain malignant cells which moved in the opposite direction. Movement and membrane deformation could be obtained with electrodes filled with various concentrated and isotonic solutions. The composition of the culture medium also had no qualitative influence on these effects. Metabolic poisons or rupture of the cell membrane had no effect on the movement. Isolated membrane fragments showed movement similar to that of intact cells. The possibility of artifacts due to proximity of the focal electrode is considered. It is shown that electro-osmosis cannot account for the present observations. Some other artifacts are also excluded. It is proposed that the most satisfactory way to account for the present observations is by a membrane carrying negative fixed charge of the order of 2500 e.s.u./sq cm. Some physiological consequences of presence of negative charge in the membrane are briefly discussed. (Author)
AD-656 977 Not available from CFSTI.

ELEMENTARY THEORY OF SYNCHRONOUS ARTERIO-ARTERIAL BLOOD PUMPS.
Research rept.,
Avco Everett Research Lab Everett Mass
Robert T. Jones, Harry E. Petschek, and Arthur R. Kantrowitz. Jul 67, 17p Rept no. AERL-RR-272
Contracts AF 49 (638)-1657, PH-43-66-1131

Descriptors: (*Heart, *Mechanical organs), Pumps, Aorta, Arteries, Blood, Blood circulation, Blood pressure, Mechanical impedance.

In the technique of arterio-arterial pumping, a volume of fluid is withdrawn from the aorta during systole and reinjected during diastole, thereby reducing the systolic pressure of the heart and adding energy to the systemic circulation. It is found

that an upper bound for the effectiveness of such devices is given by the formula (delta Q sub h/Q sub hu) - (delta P sub 1/P sub 1u) = (Q sub b/Q sub hu) ((P sub 1u - P sub 2u)/P sub 1u) where Q sub hu is the stroke output of the unaided heart and delta Q sub h is the increment caused by the pump with a stroke Q sub b. P sub 1u and P sub 2u are the systolic and diastolic pressures (unaided). Delta P sub 1 is normally negative and represents the reduction in ventricular pressure. The division of effort of the pump between the reduction of pressure and the increase of flow depends on the physiological-mechanical impedance of the heart. The total effect is, however, independent of the impedance. (Author)
AD-657 000 HC$3.00 MF$0.65

BODY VOLUME OF ADULT MEN.
Rept. for 10 Mar 64-9 Dec 66,
School of Aerospace Medicine Brooks AFB Tex
Chester L. Ward. Jun 67, 12p Rept no. SAM-TR-67-42

Descriptors: (*Anthropometry, Males), (*Body, Volume), Body weight, Lipids, Obesity, Humans, Correlation techniques.

Body composition determinations were made on 404 adult men by use of a volumetric method. The testing of a proposed nomogram for estimation of body volume from height and weight revealed the chart to be biased for adult men. Body volume was found to correlate well with body weight (correlation coefficient of .996). Body volume of men in liters, V, may be estimated from body weight in kilograms, W, by using the formula: V = -4.7573 + 1.0153 W. The ideal weight given on the USAF standard weight table was found to have a correlation coefficient of only .672 with calculated percent body fat. (Author)
AD-657 316 HC$3.00 MF$0.65

DYNAMIC BEHAVIOR OF EYE GLOBES.
Technical rept.,
Stanford Univ Calif Dept of Aeronautics and Astronautics
Robert H. Tuffias, and Max Anliker. Feb 67, 147p
Rept no. TR-1, SU-DAAR-302
Contract N00014-C-00017-0007

Descriptors: (*Eye, Mathematical models), Pressure, Viscoelasticity, Vibration, Responses, Behavior, Volume, Functions, Physiology.
Identifiers: Biomechanics.

The eye globe was treated as a spherical shell (combined cornea and sclera) filled with (vitreous and aqueous) and surrounded by (tissue and fat) incompressible, inviscid, irrotationally flowing fluids. Its dynamic behavior was investigated by making use of the Flugge shell equations and the appropriate inertia terms. The axisymmetric case was solved in closed form, and the asymmetric case was solved numerically. Some qualitative results for physiologically meaningful parameter values are given. Static and dynamic experiments were performed on enucleated dog eyes. The static experiment measured the change in volume of the eyes as a function of time at various pressures. The results of this experiment indicated that the eyes were viscoelastic with an associated time constant of approximately 20 minutes. (Author)
AD-657 382 HC$3.00 MF$0.65

THE EFFECT OF AMBIENT AND BODY TEMPERATURES UPON REACTION TIME,
Psychological Corp New York
For primary bibliographic entry see Field 5J.
AD-657 481 HC$3.00 MF$0.65

EEG CHANGES IN PERCEPTUAL AND SENSORY DEPRIVATION,
Manitoba Univ Winnipeg
M. G. Saunders, and J. P. Zubek. 1967, 13p
Grants DRB-9425-08, NIH-MH-08748-01
Availability: Published in Electroencephalography and Clinical Neurophysiology Suppl25 p246-57 1967.

Descriptors: (*Sensory deprivation, Electroencephalography), Relaxation (Physiology), Exercise, Psychometrics, Behavior, Sensory perception, Metabolism, Levarterenol, Psychophysiology.

Observations on changes in the EEG produced by 7-14 days sensory and perceptual deprivation in healthy young adults have been explored and attempts made to correlate the EEG changes with other factors. Continuous exposure to unpatterned light and noise produces the greatest effect on the occipital EEG activity. Absence of stimuli produces a lesser effect. Kinesthetic deprivation in the presence of otherwise normal backgrounds of stimulation also produces EEG changes whilst increase in kinesthetic stimulation during perceptual deprivation decreases EEG changes. Prior knowledge of the duration of deprivation appears to modify the rate of change in the EEG activity. There appears to be no clear evidence as to the cause of the EEG changes but deprivation appears to have marked effects on the individual both in the psyche and the soma. (Author)
AD-657 505 Not available from CFSTI.

PITCH CHARACTERISTICS OF SHORT TONES. II. PITCH AS A FUNCTION OF TONAL DURATION,
Johns Hopkins Univ Baltimore Md
For primary bibliographic entry see Field 5J.
AD-657 521 Not available from CFSTI.

THE LOUDNESS OF REPEATED SHORT TONES,
Johns Hopkins Univ Baltimore Md Psychological Lab
For primary bibliographic entry see Field 20A.
AD-657 527 Not available from CFSTI.

6Q. Protective Equipment

DEVELOPMENT OF AUDIO TRANSDUCER HELMET ASSEMBLY.
CBS Labs Stamford Conn
For primary bibliographic entry see Field 9A.
AD-656 938 HC$3.00 MF$0.65

FIRE RESISTING COMPOUNDS FOR CLOTHING.
Army Medical Research Lab Fort Knox Ky
13 Mar 44, 13p

Descriptors: (*Fire protective clothing, Effectiveness), Fire resistant materials, Moisture, Impregnation, Ignition, Burns, Perspiration, Humidity, Tests, Rain, Army personnel.

The purposes of the test were: (1) to evaluate the ease of field application of two flame retardant compounds to standard issue clothing; (2) to evaluate the qualities of treated garments (under anticipated extremes of humidity and temperature) with reference to comfort, irritation or dermatological reactions, undue failures of treated garments compared to untreated garments, and the possibility of perspiration or light rain leaching out the treatment; (3) to evaluate the amount of relative protection provided when garment is dry or wet with perspiration or rain; and (4) to evaluate the life of the treatment under field conditions.
AD-657 220 HC$3.00 MF$0.65

EFFECTS OF WEARING FLAMEPROOFED CLOTHING IN HOT ENVIRONMENTS.
Army Medical Research Lab Fort Knox Ky
31 Jul 45, 9p

Descriptors: (*Fire protective clothing, Acceptability), Fire resistant textiles, Fire resistant materials, Antimony compounds, Oxides, Vinyl plastics, Impregnation, Heat tolerance, Army personnel, Acclimatization, Tolerances (Physiology).

The study was carried out to determine (1) the heat load imposed by these two types of flameproofed garments and (2) the general acceptability of the clothing. The garments were worn by acclimatized subjects working in a hot environment simulating that which may be found in buttoned-up tanks (D.B. 120F. - 88F.).
AD-657 222 HC$3.00 MF$0.65

TEST OF PHYSIOLOGICAL HEAT LOAD OF FLAMEPROOFED CLOTHING.
Army Medical Research Lab Fort Knox Ky
28 Sep 45, 9p

Descriptors: (*Fire protective clothing, Acceptability), Heat tolerance, Army personnel, Acclimatization, Fire resistant textiles, Impregnation, Fire resistant materials.

Studies were made on the influence of wearing flameproofed garments on the ability of men to work in hot environments. A commercial flameproofing, 'Banflame,' was evaluated from the standpoint of heat load and general acceptability to troops. (Author)
AD-657 223 HC$3.00 MF$0.65

PHYSIOLOGICAL EFFECTS OF WEARING FLAMEPROOFED CLOTHING IN HOT ENVIRONMENTS.
Army Medical Research Lab Fort Knox Ky
17 Jul 45, 44p

Descriptors: (*Fire protective clothing, Acceptability), Heat tolerance, Army personnel, Impregnation, Fire resistant textiles, Fire resistant materials, Stress (Physiology), Perspiration, Humidity.

The studies dealt with (1) the heat load imposed by the clothing, (2) the general acceptability of the clothing from the standpoint of its flexibility, porosity and comfort, and (3) possible toxic effects from the impregnite, both locally in the form of skin rashes and systemically in whatever manner they might be manifested. Of these, the question of the heat load of the clothing is particularly important to the Armored Command because in hot climates closed armored vehicles may develop internal environments which are more severe than any naturally occurring climate. Such conditions impose severe stresses on the crew, making additional thermal loads undesirable. (Author)
AD-657 224 HC$3.00 MF$0.65

EFFECTS OF WEARING FLAMEPROOFED CLOTHING IN HOT ENVIRONMENTS.
Army Medical Research Lab Fort Knox Ky
21 Jul 45, 13p

Descriptors: (*Fire protective clothing, Acceptability), Heat tolerance, Army personnel, Impregnation, Fire resistant textiles, Fire resistant materials, Acclimatization, Perspiration, Humidity.

In the first partial report (AD-657 224) on this project, the effects of wearing a type of flameproofed and gasproofed clothing designated therein as 'D' were presented. This garment although especially prepared for use in hot climates was found to impose a greater heat load than the standard herringbone twill outfit. The increased heat load was not apparent until the men worked in the more severe environments, simulating those that may be found in buttoned-up tanks (D.B. 120F., W.B. 88F.) operating in hot climates. Inasmuch as this added heat load can be critical in determining the duration and effectiveness with which combat tank crews continue operation, flameproofed 'D' gar-

ments could not be considered entirely satisfactory for issue in very hot climates. In continuing the evaluation of flameproofed garments for tank crews, a small batch of flameproofed and gas-proofed clothing, 'X,' was subjected to test. The essential components of this impregnating mixture were identical with those used in the 'D' impregnation. It is to be noted that the constituents of the two impregnating agents are the same, with the exception that the 'X' garments contained twice as much aluminum stearate in the garment. The final pickup of impregnite of both was practically equal. (Author)
AD-657 225 HC$3.00 MF$0.65

TEST OF INJURIES AND BURNS FROM ROCKET LAUNCHERS,
Army Medical Research Lab Fort Knox Ky
For primary bibliographic entry see Field 6U.
AD-657 226 HC$3.00 MF$0.65

METHODS OF PROTECTION AGAINST FLASH BURNS.
Army Medical Research Lab Fort Knox Ky
For primary bibliographic entry see Field 6U.
AD-657 231 HC$3.00 MF$0.65

A PROTECTIVE PASSENGER SMOKE HOOD,
Civil Aeromedical Inst Oklahoma City Okla
Ernest B. McFadden, H. I. Reynolds, and Gorden E. Funkhouser. Apr 67, 12p
FAA-AM-67-4

Descriptors: (*Fire protective clothing, *Breathing apparatus), Polyamide plastics, Amides, Polymers, Films, Metal coatings, Aircraft fires, Smokes, Survival.

Several recent jet transport accidents have focused the attention of the aviation industry upon smoke and toxic gases as causal factors of passenger incapacitation and failure to evacuate aircraft before fire and heat render the environment uninhabitable. If it were possible to provide passengers with a short duration supply of breathing air sufficient to maintain the passengers' mobility and allow completion of aircraft evacuation, survival would be enhanced. Simple, light-weight, bag-shaped hoods incorporating a neck seal were fabricated of a thin pliable, high-temperature, transparent, polyimide plastic film. Polyimide film has no melting point but reportedly chars at 1500 deg F. In a more advanced design, thin transparent metallic coatings were applied to the polyimide film in order to reflect up to 90% of the radiant heat. Upon exposure to a specific infra-red heat flux, facial skin temperatures of 114-115 F were recorded on twelve human subjects wearing the non-metalized hood. Under identical conditions, skin temperatures of the same subjects wearing the metalized hood did not exceed 99 F. Capability of the hood to provide short term and extended protection from smoke and flame inhalation in a fire environment is discussed. (Author)
AD-657 436 HC$3.00 MF$0.65

6R. Radiobiology

CHANGES IN THE SENSITIVITY OF X-IRRADIATED MICE TO BACTERIAL ENDOTOXIN,
Defence Chemical Biological and Radiation Labs Ottawa (Ontario)
P. V. Vittorio, E. A. Watkins, and S. Dziubalo-Blehm. 30 Sep 66, 7p Rept no. DCBRL-524
Availability: Published in Canadian Journal of Physiology and Pharmacology v45 p395-400 1967.

Descriptors: (*Radiation effects, *Toxins + antitoxins), X rays, Radiological dosage, Lethal dosage, Excretion, Radiobiology, Mice, Canada.

When endotoxin was injected into mice 4 to 24 hours after X-irradiation the LD50/3 was increased from 500 micrograms (non-irradiated control) to 715 micrograms and 825 micrograms respectively. Administration of different doses of X-irradiation showed that increasing the dose from 200 to 600 R caused a linear increase in the endotoxin LD50 of mice and it was in the order of 100 micrograms per 200 R. From 800 R to 1400 R there was a decrease in the endotoxin LD50 of mice, but only the 1400-R dose produced a lower LD50 than that in the non-irradiated control. Since whole-body counter studies with 51Cr-labelled endotoxin showed that X-irradiation did not change endotoxin excretion, increased endotoxin LD50 values 4 and 24 hours after X-irradiation were not due to increased rates of endotoxin excretion. (Author)
AD-656 815 Not available from CFSTI.

A CORRELATION BETWEEN RADIATION-INDUCED FREE RADICALS AND SURVIVAL IN MICRO-ORGANISMS EXPOSED TO BETA-MERCAPTOETHYLAMINE UNDER OXYGEN OR NITROGEN,
Walter Reed Army Inst of Research Washington D C
Harold M. Swartz, and Earl C. Richardson. 26 Jan 67, 14p
Availability: Published in Int. J. Rad. Biol., v12 n1 p75-88 1967.

Descriptors: (*Free radicals, Radiobiology), (*Radiation effects, Microorganisms), Radioprotective agents, Survival, Oxygen, Nitrogen, Thiols.
Identifiers: Cysteamine.

Both free radical and survival measurements were made on the same samples of micro-organisms irradiated at -196C. Under these conditions, which minimized indirect effects, pronounced oxygen (radiosensitization) and MEA (radioprotection) effects were observed. MEA protected in the presence of N2 or O2. The reduction in certain types of bacterial radicals by MEA correlated with an increase in bacterial survival. Sulphur-type radicals were not found. These findings indicate: (1) A relation exists between free-radical reduction and radiation protection; (2) MEA is in contact with the protected biological molecules; (3) Transfer of unpaired electrons to the sulphur nucleus in MEA is not required for radiation protection; (4) MEA protection includes a mechanism that does not involve competition with oxygen; (5) The oxygen-effect involves direct interaction of oxygen with biological molecules. (Author)
AD-656 862 Not available from CFSTI.

RESPONSE OF GUINEA PIG TO SUBLETHAL X-IRRADIATION AND LIVE TULAREMIA VACCINE,
Fort Detrick Frederick Md
John E. Nutter, and Henry T. Eigelsbach. 19 Dec 66, 4p
Availability: Published in Proceedings of the Society for Experimental Biology and Medicine v124 p1227-30 1967.

Descriptors: (*Radiation effects, *Immunity), Whole body irradiation, Sublethal dosage, X rays, Vaccines, Pasteurella tularensis, Resistance (Biological), Guinea pigs, Responses.

Sublethal whole-body X-irradiation of the guinea pig before or after respiratory vaccination with normally innocuous P. tularensis LVS may result in death. No evidence of a change from a self-limiting to a fulminating type of infection was obtained. Irradiated vaccinated animals produced agglutinin titers only slightly lower than nonirradiated controls. Only a small decrease in resistance to tularemia was observed between surviving irradiated vaccinees and nonirradiated vaccinees. (Author)
AD-656 875 Not available from CFSTI.

RADIATION SAFETY TECHNICIAN TRAINING COURSE,
Argonne National Lab., Ill.
H. J. Moe, S. R. Lasuk, and M. C. Schumacher. Sep 66, 359p
Contract W-31-109-eng-38

Descriptors: (*Radiation measurement systems, *Radiobiology), (*Health physics instrumentation, *Reactor safety systems), Technicians, Training, Radiation monitors).

For abstract, see NSA 21 16.
ANL-7291 HC$3.00 MF$0.65

RETENTION OF IODINE ON SELECTED PARTICULATE FILTERS AND A POROUS SILVER MEMBRANE BEING CONSIDERED FOR THE LOFT MAYPACK,
Idaho Nuclear Corp., Idaho Falls.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 16.
IN-1078 HC$3.00 MF$0.65

ANNUAL REPORT ON RESEARCH PROJECT.
Columbia Univ., New York. Radiological Research Lab.
1 Jan 67, 220p
Contract AT (30-1)-2740

Descriptors: (*Radiobiology, *Radiation measurement systems), (*Radiological dosage, Biophysics).

For abstract, see NSA 21 16.
NYO-2740-4 HC$3.00 MF$0.65

THE 137 CS BODY BURDEN OF CIVILIAN PILOTS.
Scandinavian Airlines System, Oslo (Norway).
B. Hannisdahl, and A. Sroemme. 1966, 4p NYO-3364-32, CONF-661120-1
Contract AT/30-1/-3364
Presented At Intern. Meeting on Aerospace Med., Sydney, 28 Nov.-1 Dec. 1966

Descriptors: *Cesium 137, *Civil aviation, *Human body, *Pilot, *Radioactive contamination, Atmosphere, Aviation, Body, Chamber, Civil, Contamination, Explosion, Fallout, Human, Measurement, Norway, Nuclear, Radioactivity, Steel.

For abstract, see STAR 05 19.
N67-33714 HC$3.00 MF$0.65

SOURCE ARRANGEMENT FOR A LOW-EXPOSURE-RATE TOTAL-BODY IRRADIATION FACILITY FOR MAN,
Oak Ridge Associated Universities, Tenn.
Patricia Dalton, and Roger Cloutier. May 67, 211p
Contract AT (40-1)-GEN-33

Descriptors: (*Whole body irradiation, *Humans), (*Radiological dosage, *Radiobiology), Exposure, Radiotherapy, Sources, Medical research, Shielding.

For abstract, see NSA 21 16.
ORINS-52 HC$3.00 MF$0.65

EFFECTS ON MICE OF CONTINUAL EXPOSURE TO RADON AND ITS DECAY PRODUCTS ON DUST,
Rochester Univ., N. Y. Atomic Energy Project.
Donald A. Morken, and James K. Scott.1 Oct 66, 135p
Contract W-7401-eng-49

Descriptors: (*Radiobiology, Mice), (*Radon, *Radiation effects), Radioactive decay, Exposure, Dust.

For abstract, see NSA 21 16.
UR-669 HC$3.00 MF$0.65

6S. Stress Physiology

PULMONARY EDEMA OF HIGH ALTITUDE: A REVIEW OF CLINICAL AND PATHOLOGICAL CONSIDERATIONS,
Army Research Inst of Environmental Medicine Natick Mass
For primary bibliographic entry see Field 6E.
AD-656 817 Not available from CFSTI.

PHYSICAL AND PHYSIOLOGICAL FACTORS IN FATAL EXPOSURES TO COLD,
Army Research Inst of Environmental Medicine Natick Mass
Marlin B. Kreider. 18 Jul 66, 11p
Availability: Published in National Speleological Society Bulletin v29 n1 p1-11 Jan 1967.

Descriptors: (*Exposure, Survival), (*Hypothermia, Survival), Tolerances (Physiology), Accidents, Body temperature, Heat production (Biology), Fatigue (Physiology), Physical fitness, Exercise, Body weight, Nutrition, Protective clothing, Evaporation, Water, Cooling, Responses, Stress (Physiology).
Identifiers: Caves, Cold tolerance.

The deaths of three cave explorers recently from exposure to cold came as a surprise because of the moderate climate of most caves. The special conditions not usually present simultaneously during cave explorations which contributed to these fatalities are: (1) frequent or continuous exposure to cold water, (2) continuation and even intensification of the exposure after the first signs of deterioration from the cold are apparent, (3) the necessity to perform heavy and skilled work in order to make an exit from the cave during this period of increased cold exposure when fatigue from hours of exploring is severe, and (4) wearing of lightweight clothing. When the first signs of deterioration due to cold appeared, rewarming should have begun immediately because this is when body temperature began to drop more rapidly than before. In these cases where death is assumed to be due to hypothermia, it must have dropped very rapidly since death came within 1 1/2 hours of the first signs of deterioration. The personal factors which are favorable to the maintenance of body temperature are good physical fitness which provides a high capacity for exercise and thus for body heat production; good nutritional status; good health; large body size and fat content; abstinence from drugs affecting performance and body function. However, since cooling in water is two to four times faster than in air, the use of protective clothing is necessary. Layered woolen clothing, covered by an outer shell of tight weave which is closed at the cuffs, sleeves and neck to reduce convective cooling, give the next best protection to that of a foam rubber suit during water immersion. (Author)
AD-656 819 Not available from CFSTI.

THE EFFECT OF REPEATED HEAT AND COLD EXPOSURE ON SERUM PROTEIN COMPOSITION IN MAN,
Army Research Inst of Environmental Medicine Natick Mass
W. F. Blatt, and J. Kerkay. 25 Jun 66, 6p
Availability: Published in Canadian Journal of Physiology and Pharmacology v45 p571-5 1967.

Descriptors: (*Acclimatization, Blood proteins), Exposure, Heat tolerance, Lipoproteins, Metabolism, Electrophoresis, Hematocrit, Body temperature, Stress (Physiology).
Identifiers: Cold tolerance.

Total protein, serum protein, and lipoprotein electrophoretic distribution and hematocrit values were determined in two groups of men during acclimatization to 6 weeks of cold and 11 days of heat respectively. After 3 weeks of cold exposure total serum protein and albumin content decreased, while the globulin fractions increased; thus, the calculated albumin/globulin ratio was significantly depressed. During the last 2 weeks, these parameters gradually returned to control values. Overall, the protein changes during heat acclimatization were minimal, although the globulins decreased slightly, yielding a small increase in the albumin/globulin ratio. The hematocrit levels were significantly lowered during both environmental exposures, whereas the lipoprotein distribution remained essentially unchanged. (Author)
AD-656 821 Not available from CFSTI.

EFFECT OF ACUTE EXPOSURE TO ALTITUDE ON TIME ESTIMATION,
Army Research Inst of Environmental Medicine Natick Mass
Richard L. Cahoon. 15 May 67, 4p
Presented at Annual Meeting of the Eastern Psychological Association (38th), Apr 1967. Research supported in part by Advanced Research Projects Agency.
Availability: Published in The Journal of Psychology v66 p321-4 1967.

Descriptors: (*Stress (Physiology), *Rhythm (Biology)), Time, High altitude, Metabolism, Central nervous system, Electroencephalography.

Since, as Hoagland suggested, time estimation is regulated by the rate of cellular metabolism in the central nervous system (c.n.s.), it was hypothesized in the present study that subjective time (the 'chemical clock') would be slower at high altitude than at sea level, and would lead to an underestimation of clock time intervals. The study consisted of two phases: a sea level phase conducted at Fort Bragg, North Carolina, and a high altitude phase at Mt. Evans, Colorado (12,900 feet in altitude). The procedures for both phases were the same. Three methods of time estimation were used. In the verbal estimation method, Ss were required to write their subjective estimates of a 36-second interval which was delimited by two buzzes. This was repeated three times and the mean of the three estimates was taken as the Ss' scores. In the production method, Ss were required to produce a 22-second interval by depressing a telegraph key for that period of time. Their estimates were recorded on electric clock timers wired to the keys. Again, the means of three estimates was taken as the Ss' scores. In the tapping method, Ss were asked to tap on telegraph keys at a rate of one-per-second during a 30-second interval. The total number of taps given was recorded and the mean of three such totals served as the Ss' scores. The data are consistent with Hoagland's 'chemical clock' hypothesis and with the hypothesis that alpha frequency and subjective time are regulated by the same internal pacemaker.
AD-656 822 Not available from CFSTI.

CARDIAC RATE CHANGES IN HUMANS AFTER ABRUPT DECELERATION,
Aeromedical Research Lab (6571st) Holloman AFB N Mex
Jerry D. Rothstein, and Peter G. Hanson. 29 Dec 66, 5p
Availability: Published in Journal of Applied Physiology v22 n4 p645-7 Apr 1967.

Descriptors: (*Impact shock, Electrocardiography), Heart, Deceleration, Pulse rate, End organs, Arteries, Aorta.

Transient slowing of the cardiac rate has been observed after experimental abrupt deceleration (impact) when the deceleration inertial vector is directed craniad (-Gz). We have attempted to clarify the incidence and conditions of this response. Eighteen healthy male subjects (21-41 years) were exposed to -Gz and +Gz impact profiles of 10 G peak deceleration in paired experiments. Cardiac rate was monitored prior to and after impact by vectorcardiology. The data show that -Gz deceleration produces a statistically significant decrease in cardiac rate immediately after impact. An insignificant increase in cardiac rate occurred after +Gz impact. It is suggested that the observed changes in cardiac rate are mediated through the pressoreceptors of the carotid sinus and aortic arch. (Author)
AD-656 829 Not available from CFSTI.

THE INFLUENCE OF METHIMAZOLE ON THE CATECHOLAMINE EXCRETION OF COLD-STRESSED RATS,
Toronto Univ (Ontario) Dept of Pharmacology
G. E. Johnson, K. V. Flattery, and E. Schonbaum. 7 Oct 66, 7p
Grants DRB-9370-07, DRB-9310-110
Availability: Published in Canadian Journal of Physiology and Pharmacology v45 p415-21 1967.

Descriptors: (*Amines, Excretion), Exposure, Cold weather tests, Levarterenol, Thyroid gland, Secretion, Metabolism, Body temperature, Stress (Physiology), Epinephrine, Heat production (Biology), Canada.
Identifiers: Methimazole.

The exposure of the albino rat to a cold environment (4C) results in both an increased urinary excretion of noradrenaline and an increased thyroid activity. Failure of the animal to secrete adequate amounts of noradrenaline or, in its absence, adrenaline, results in hypothermia and death. The influence of thyroid activity on the secretion of catecholamines and the maintenance of metabolic rate and body temperature in cold-stressed rats was investigated. Cold-acclimated rats kept at 4C were fed the antithyroid drug methimazole (0.1% in the drinking water) for 3 weeks. The excretion of free adrenaline and noradrenaline doubled. A parallel increase in normetanephrine excretion suggested an increased catecholamine secretion. Both body temperature and metabolic rate dropped on the third week. A similar experiment done on normal rats placed at 27C showed that methimazole failed to alter catecholamine excretion in the warm environment. It is postulated that the increase in secretion of adrenaline and noradrenaline at 4C resulted from a decrease in the intrinsic metabolic activity of the catecholamines and is a compensatory mechanism for maintenance of heat production. (Author)
AD-656 836 Not available from CFSTI.

LIPID PEROXIDATION (THIOBARBITURIC ACID REACTING MATERIAL) AND ENZYME INHIBITION IN RAT BRAIN HOMOGENATES EXPOSED TO OXYGEN AT HIGH PRESSURE.
Defence Research Medical Labs Toronto (Ontario)
For primary bibliographic entry see Field 6T.
AD-656 837 Not available from CFSTI.

RESULTS OF ELECTROENCEPHALOGRAPHIC EXAMINATIONS UNDER THE INFLUENCE OF VIBRATION AND CENTRIFUGING IN THE MONKEY,
California Univ Los Angeles Brain Research Inst
W. R. Adey, R. T. Kado, and D. O. Walter. 1967, 20p
AFOSR-67-1857
Contracts AF 49 (638)-1387, NAS-9-1970
Availability: Published in Recent Advances in Clinical Neurophysiology, Electroenceph. Clin. Neurophysiology suppl-25 p227-45 1967.

Descriptors: (*Vibration, Electroencephalography), Acceleration, Acceleration tolerance, Experimental design, Cerebrovascular system, Brain, Head, Nerves, Vestibular apparatus, Stress (Physiology), Monkeys.

The EEG recorded in trasverse and longitudinal acceleration and during vibration of the whole body has been shown in previous studies to provide a close correlation with levels of consciousness, as these may be modified by embarrassment of cerebral circulation or by intense somesthetic barrages during vibration. Necessarily, such studies impose rigorous requirements on the entire sensing and recording system to ensure freedom from contamination of the records by connecting lead artifacts or environmental magnetic fields, particularly during vibratory stimuli. Previous studies employed anesthesia and shaking after death as additional controls in support of the physiological basis of the apparent EEG 'driving' induced by vibration. These observations were extended to compare the effects of shaking in normal monkeys and those deprived of vestibular inputs by bilateral eighth nerve section. A recent communication from Nicholson and Guignard (1965) dismissed EEG driving during vibration as an artifact. Extensive computer analysis of the data provides further evidence, however, that the phenomenon has a physiological basis, and emphasizes the need for both adequate methods of data acquisition in such tests, and the value of more sophisticated analysis than simple visual inspection of paper records. The effects were tested on the EEG of compound positive accelerations in simulation of an actual booster profile, and concurrent changes in cerebral and cardiac functions following a high G 'pulse' were observed. (Author)
AD-656 969 Not available from CFSTI.

ANALYSIS OF BRAIN WAVE RECORDS FROM GEMINI FLIGHT GT-7 BY COMPUTATIONS TO BE USED IN A THIRTY DAY PRIMATE FLIGHT,
California Univ Los Angeles Brain Research Inst
W. R. Adey, R. T. Kado, and D. O. Walter. 1967, 31p
AFOSR-67-1881
Grants AF-AFOSR-246-63, NsG-2503
Availability: Published in Life Sciences and Space Research, (Amsterdam) p65-93 1967.

Descriptors: (* Space medicine, Electroencephalography), Central nervous system, Cardiovascular system, Metabolism, Electromyography, Galvanic skin response, Respiration, Electrocardiography, Electrophysiology, Urine, Cannulation, Behavior, Motor reactions, Decision making, Sleep Attention, Vestibular apparatus, Monkeys.
Identifiers: Electrooculography.

It is planned to study central nervous, cardiovascular and metabolic functions in a 6.8 kg macaque monkey flown in earth orbit for a period of 30 days during 1967. Monitoring of central nervous functions will be by EEG electrodes in surface and deep brain structures, and by EMG recordings from neck and trunk musculature. Eye movements will be recorded by the EOG and galvanic skin responses will be assessed from the skin of the foot. Respiration will be recorded with an impedance pneumogram, together with the EKG. Behavioral tasks will involve tests of perception and recent memory (delayed matching to sample) and eye-hand coordination tests of vestibular functions and spatial orientation. Urine will be collected by a special catheterization technique and subjected to in-flight recording. Our extensive development of EEG spectral analysis techniques has proven the feasibility of accurate assessment of states of alertness, particularly in relation to decision-making requirements, and states of drowsiness, fatigue and detection of levels of sleep, including dream states. We have applied these techniques to approximately 60 hr of EEG data gathered on one subject in a Gemini astronaut flight (GT-7). Data will be presented on states of sleep and wakefulness in this subject during the first 55 hr of flight, with reference to possible changes induced by the space environment. (Author)
AD-657 057 Not available from CFSTI.

MULTIFOCAL PREMATURE CONTRACTIONS, AN ECG FINDING OF GRAVE SIGNIFICANCE,
School of Aerospace Medicine Brooks AFB Tex
Internal Medicine Branch
For primary bibliographic entry see Field 6N.
AD-657 219 Not available from CFSTI.

EFFECT OF -7Gx ACCELERATION ON RENAL EXCRETION OF SOLUTES IN RABBITS,
School of Aerospace Medicine Brooks AFB Tex
Lee A. Bricker, Wayne A. Johnson, Chesley R. Davies, and Robert A. Dottore. 1967, 8p Rept no. SAM-TR-66-291
Availability: Published in Aerospace Medicine v38 n1 p35-8 Jan 1967.

Descriptors: (* Acceleration tolerance, Urinary system), Urine, Excretion, Sodium, Potassium, Blood, Erythrocytes.

The effects of one hour of uninterrupted -7Gx acceleration on rate of urine flow and urinary excretion of sodium, potassium, and total solute were studied in rabbits. Urine flow rate during exposure to acceleration fell to an average of 56 per cent of control values; urinary excretion of sodium fell concurrently to 45 per cent of control, and potassium to 67 per cent. There was no significant change in total solute excretion. The declines observed were abrupt, as were the returns to control levels after acceleration. The data suggest that hemodynamic rather than hormonal influences were primarily responsible for these changes. Gross or microscopic hematuria observed in the sediments of most acceleration urine specimens disappeared or abated during the recovery phase. Occasional red cell casts indicated that the hematuria was due, at least in part, to an intrarenal lesion. (Author)
AD-657 417 Not available from CFSTI.

A PROSPECTIVE LOOK AT MEDICAL PROBLEMS FROM HAZARDS OF SPACE OPERATIONS.
Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
D. E. Busby. Jul 67, 446p NASA-CR-856
Contract NASR-115

Descriptors: * Aerospace medicine, * Bibliography, * Clinical medicine, * Diagnosis, Aerospace, Astronaut, Carbon dioxide, Clinical, Decompression, Hazard, Injury, Medicine, Safety, Sickness, Stress, Thermal, Weightlessness.

For abstract, see STAR 05 19.
N67-32905 HC$3.00 MF$0.65

AEROSPACE MEDICINE AND BIOLOGY - A CONTINUING BIBLIOGRAPHY WITH INDEXES, MAY 1967.
National Aeronautics and Space Administration, Washington, D. C.
Jun 67, 144p NASA-SP-7011/38/

Descriptors: * Aerospace medicine, * Bibliography, * Biology, Abstract, Aerospace, Environment, Index, Life, Man, Medicine, Pharmacology, Physiology, Psychology, Safety, Space flight, Support, Toxicology.

For abstract, see STAR 05 19.
N67-33154 HC$3.00 MF$0.65

6T. Toxicology

THE MEASUREMENT OF THE EXHAUST COMPOSITION OF SELECTED HELICOPTER ARMAMENT,
Army Aeromedical Research Unit Fort Rucker Ala
For primary bibliographic entry see Field 19A.
AD-655 844 HC$3.00 MF$0.65

LIPID PEROXIDATION (THIOBARBITURIC ACID REACTING MATERIAL) AND ENZYME INHIBITION IN RAT BRAIN HOMOGENATES EXPOSED TO OXYGEN AT HIGH PRESSURE.
Technical note,
Defence Research Medical Labs Toronto (Ontario)
J. D. Wood, and W. J. Watson. 28 Dec 66, 5p
Rept no. DRML-TN-659
Availability: Published in Canadian Journal of Physiology and Pharmacology v45 p752-5 1967.

Descriptors: (* Oxygen, Toxicity), Lipids, Oxidation, Poisoning, Enzymes, Coenzymes, Enzyme inhibitors, Antioxidants, Brain, Convulsive disorders, Acetylcholinesterase, Carboxy-lyases, Canada.
Identifiers: OHP.

It is suggested that oxygen poisoning may result from the direct inhibition of enzymes and coenzymes by lipid peroxides. The study was initiated to shed further light on this hypothesis. The effect of antioxidants on lipid peroxidation and enzyme inhibition in brain homogenates exposed to oxygen at high pressure (OHP) was determined. If lipid peroxides do, in fact, directly inhibit enzyme systems, a reduction of lipid peroxide formation by the antioxidants should bring about a concomitant decrease in enzyme inhibition. Glutamic acid decarboxylase (GAD) and acetylcholinesterase (AChE) enzyme systems were chosen for the study because of their known inhibition by OHP and because of their possible respective roles in nerve transmission, GAD producing gamma-aminobutyric acid, a modulator of nerve transmission, and AChE destroying the excitatory substance acetylcholine. Since convulsions are a prime manifestation of oxygen toxicity the inhibition of these enzyme systems may well be involved in the production of the seizures. (Author)
AD-656 837 Not available from CFSTI.

INTERSTITIAL PULMONARY EDEMA: AN ELECTRON MICROSCOPIC STUDY OF THE PATHOLOGY OF STAPHYLOCOCCAL ENTEROTOXEMIA IN RHESUS MONKEYS,
Fort Detrick Frederick Md
Milton J. Finegold. 1 Mar 67, 14p
Availability: Published in Laboratory Investigation v16 n6 p912-24 1967.

Descriptors: (* Lungs, * Edema), (* Staphylococcus, Toxins + antitoxins), Monkeys, Pathology, Electron microscopy, Hemorrhage, Toxicity.

Interstitial pulmonary edema was produced in rhesus monkeys by intravenous injections of staphylococcal enterotoxin B, a purified protein toxin. The primary pathologic change, as revealed by electron microscopy, was capillary endothelial cell degeneration and necrosis, with less frequent damage to the endothelium of venules. Secondary phenomena were interstitial hemorrhage and edema and a histiocytic infiltrate. There was striking herniation of capillary endothelium into the vascular lumen which may contribute significantly to decreased pulmonary perfusion in this toxemia. (Author)
AD-656 876 Not available from CFSTI.

STUDIES RELATED TO AN EARLY DETECTION OF TOXIC EFFECTS OF ORGANIC CHEMICALS.
Final rept. Oct 65-31 Aug 67,
Kansas Univ Lawrence
Harbans Lal. 31 Aug 67, 33p
Contract N00014-66-C-0006

Descriptors: (* Chloroform, Toxicity), Liver, Microsomes, Enzymes, Barbiturates, Metabolism, Hypnosis, Oxidoreductases, Analgesics + antipyretics, Pharmacology, Responses.

Inhalation of methylchloroform containing air in a continuous flow inhalation chamber altered the pharmacological responsiveness of the exposed animal. It decreased the duration of hypnosis induced by hexobarbital or pentobarbital but did not affect the barbital or chloralhydrate hypnosis. There was a significant increase in the hexobarbital oxidase activity of the liver microsomes but the microsomal nitro-reductase was not affected. The pharmacological as well as the biochemical changes were reversible. They were blocked by the pretreatment with ethionine. Intraperitoneal injections of methylchloroform produced effects which were opposite to those produced by its inhalation. The pentobarbital hypnosis was prolonged and the liver hexobarbital oxidase activity was depressed. It is concluded that methylchloroform produced specific changes in the drug metabolising enzyme systems. The nature of these changes were related to the route of administration of this agent. (Author)
AD-657 252 HC$3.00 MF$0.65

THE IN-VIVO INACTIVATION OF FACTOR VIII (ANTIHEMOPHILIC GLOBULIN) BY HYDRAZINE: ITS RELATION TO THE FIBRINOLYTIC MECHANISM,
School of Aerospace Medicine Brooks AFB Tex
Jarrell D. Bairrington. 1967, 9p Rept no. SAM-TR-66-201
Availability: Published in Aerospace Medicine v38 n1 p5-9 1967.

Descriptors: (*Hydrazine, Toxicity), (*Blood coagulation, Hydrazine), Prothrombin, Plasmin, Globulins, In vivo analysis, Inhibition, Blood diseases, Hemorrhage, Diagnosis, Rats.

The in-vivo effects of a 0.6 LD/50 dose of hydrazine on the prothrombin activating mechanism and the fibrinolytic mechanism were studied in ether anesthetized rats. The studies were evaluated by means of the Prothrombin Time, Thromboplastin Generation Test, Factor VIII and IX Assays, Factor XIII (Clot Urea Solubility) and Quantitative Measurements of Free and Total Profibrinolysin, and the Euglobulin Inhibitor. Factor VIII (antihemophilic globulin) activity was found to be decreased to the level of hemophilia. Euglobulin inhibitor was also decreased. Decrease of Factor VIII activity was correlated with activation of fibrinolysis due to decrease of the euglobulin inhibitor. The possible usefulness of these findings for a diagnostic test for hydrazine intoxication in workers with these propellants and the mechanism of the decrease of Factor VIII and euglobulin inhibitor are discussed. (Author)
AD-657 416 Not available from CFSTI.

THE EFFECT OF MONOMETHYLHYDRAZINE ON METHEMOGLOBIN PRODUCTION IN VITRO AND IN VIVO,
School of Aerospace Medicine Brooks AFB Tex
Sidney R. Fortney, and Dale A. Clark. 1967, 8p Rept no. SAM-TR-66-224
Availability: Published in Aerospace Medicine v38 n3 p239-42 Mar 1967.

Descriptors: (*Methyl hydrazines, Toxicity), Hemoglobin, In vitro analysis, In vivo analysis, Blood chemistry, Hydrazine derivatives.

After large doses of hydrazine (>2.3 mM/kg.) administered to anesthetized dogs, absorption spectra of blood indicated presence of small amounts of methemoglobin. However, one hour after intravenous injection of 0.54 mM/kg. monomethylhydrazine (MMH), methemoglobin reached a level greater than 30% of total hemoglobin and thereafter decreased slowly. Methemoglobin was also produced from oxyhemoglobin in vitro with either whole blood or purified hemoglobin preparation. When higher levels of MMH were incubated with hemoglobin, a compound different from methemoglobin or oxyhemoglobin appeared. Spectra of these incubation mixtures revealed the presence of a component having absorption peaks at 1005,570, 542, and 438 mu. This compound could be a result of MMH interaction with heme iron, since carboxyhemoglobin was resistant to the formation. Comparison of the effects of several hydrazine derivatives showed that MMH is more active than the other derivatives in producing methemoglobin and has a lower LD50. However, MMH is less active than hydrazine in causing glycogen depletion, hypoglycemia, or lactate elevation. MMH-induced methemoglobinemia is severe when compared to other toxic methemoglobinemias. However, the contribution of methemoglobinemia to the overall toxic effect of MMH in vivo is only speculative. The appearance of methemoglobin may, however, serve as an index of severity of exposure to MMH. (Author)
AD-657 418 Not available from CFSTI.

6U. Weapon Effects

TREATMENT OF ACUTE RADIATION INJURY UNDER MEDICALLY AUSTERE CONDITIONS,
Rochester Univ N Y
For primary bibliographic entry see Field 6E.
AD-657 178 Not available from CFSTI.

TEST OF INJURIES AND BURNS FROM ROCKET LAUNCHERS,
Army Medical Research Lab Fort Knox Ky
Charles R. Park. 8 Dec 44, 13p

Descriptors: (*Rocket launchers, *Wounds + injuries), Burns, Hazards, Protective masks, Eyeglasses, Skin, Blast, Cold weather tests, Effectiveness.

The purposes of the study were (1) to determine the cause and character of injuries to the exposed skin and eyes of personnel when firing the rocket launchers M1A1, M9 and M9A1; (2) to determine the relative hazard of firing in cold weather; (3) to test the suitability of various protective face masks. (Author)
AD-657 226 HC$3.00 MF$0.65

TIME-TEMPERATURE RELATIONSHIPS WHICH PRODUCE HOT AIR BURNS OF HUMAN SKIN.
Army Medical Research Lab Fort Knox Ky
20 Jul 44, 6p

Descriptors: (*Burns, Skin), Tanks (Combat vehicles), Temperature, Protection, Exposure, Fires.
Identifiers: Flash burns.

A flash burn may be produced by exposure of the skin to very hot gases even though the duration of contact is extremely short. Temperatures causing flash burns are estimated to be in the neighborhood of 1500C with an exposure time of 0.01 seconds or less. Such flashes may be encountered in tanks. From available reports it seems that the initial flash is followed by a short period before general conflagration starts--if it does start. Once started, if not put under control, the tank fire increases the air temperature to values of 1000F and above in a few seconds. In order to obtain a clearer understanding of the problem it seemed desirable to know the time-temperature relationship necessary to produce incipient and moderately severe burns from hot gases of temperatures under 1500C. These data were obtained experimentally by a procedure described.
AD-657 228 HC$3.00 MF$0.65

METHODS OF PROTECTION AGAINST FLASH BURNS.
Army Medical Research Lab Fort Knox Ky
13 Nov 43, 21p

Descriptors: (*Burns, Skin), Fires, Tanks (Combat vehicles), Protection, Protective treatments, Ointments, Fire resistant coatings, Casualties, Ignition, Fire protective clothing, Fire resistant textiles.
Identifiers: Flash burns.

The purpose of the report is to describe means of protecting against flash burns in tanks and to report the results of test of a protective cream. The short time required in evacuation, special attention was directed to various means of protection of the exposed surfaces. Extra flaps on the sleeves of garments, and face and neck shields designed to be suspended from the helmet, were considered. Such attachments have not found favor because they interfere with activity in the tank and add to the heat load imposed by the uniform. The application of ointment before combat for the purpose of protecting exposed skin has long been the practice in the Navy, and, for this purpose an improved film-forming ointment was developed by the Naval Medical Research Institute. The results of laboratory and field test with the material are given. Some general notes on the nature and characteristics of the cream and the method of application are presented. Consideration is also given to the use of methods of reducing flammability of clothing, not so much from the point of view of increasing the duration of the protection within the tank but rather to eliminate after-burning subsequent to ignition. A discussion is presented of the possible usefulness of flame-retardant materials.
AD-657 231 HC$3.00 MF$0.65

7. CHEMISTRY

7A. Chemical Engineering

ANALYSIS OF DATA IN REVERSE OSMOSIS WITH POROUS CELLULOSE ACETATE MEMBRANES USED,
National Research Council of Canada Ottawa (Ontario)
Shoji Kimura, and S. Sourirajan. 26 Sep 66, 8p Rept no. NRC-9504
Availability: Published in A.I.Ch.E. Journal, v13 n3 p497-503 1967.

Descriptors: (*Desalination, Osmosis), (*Osmosis, Analysis), (*Membranes, Osmosis), (*Cellulose acetates, Osmosis), Sea water, Salts, Diffusion, Concentration (Chemistry), Mass transfer, Permeability, Canada.

Reverse osmosis experimental data for some inorganic salts with the porous cellulose acetate membrane used were analyzed to obtain their diffusivity in the membrane. A parameter including the diffusivity was found constant for each film in the concentration range investigated for a particular solute at a particular pressure. This parameter was also independent of feed flow rate. The effect of operating pressure on the parameter was found to depend on the film shrinkage. Mass transfer coefficient between the membrane and the feed solution was also obtained by the analysis, and this value was independently checked by the diffusion current method. Coincidence of these coefficients shows that the ordinary mass transfer coefficient can be used in reverse osmosis with the appropriate driving force. These facts facilitate the prediction of solute separation and membrane throughput rate in reverse osmosis. (Author)
AD-656 832 Not available from CFSTI.

MECHANISM OF PELLET GROWTH IN WET PELLETIZATION.
Revised ed.,
National Research Council of Canada Ottawa (Ontario)
C. E. Capes. 23 Jan 67, 4p Rept no. NRC-9519
Revision of manuscript submitted 24 Jun 1966.

Availability: Published in I and EC Process and Development v6 n3 p390-2 Jul 1967.

Descriptors: (*Pellets, Industrial production), Material forming, Tracer studies, Sand, Particle size, Canada.
Identifiers: Pelletization.

Recent investigations have shown that during the batch wet pelletization process, the pellet size distribution is self-preserving. Different models for the process have been proposed to account for this behavior. Tracer experiments on the wet pelletization of sand are now described which aid in understanding the mechanism of pellet growth. (Author)
AD-656 957 Not available from CFSTI.

SALT EFFECT IN DISTILLATION: A LITERATURE REVIEW.
Royal Military Coll of Canada Kingston (Ontario) Dept of Chemistry and Chemical Engineering
For primary bibliographic entry see Field 7D.
AD-657 081 Not available from CFSTI.

PYROLTIC CARBIDE DEVELOPMENT PROGRAM.
High Temperature Materials Inc Boston Mass
For primary bibliographic entry see Field 11B.
AD-657 188 HC$3.00 MF$0.65

PYROLYTIC CARBIDE DEVELOPMENT PROGRAM.
High Temperature Materials Inc Boston Mass
For primary bibliographic entry see Field 11B.
AD-657 189 HC$3.00 MF$0.65

PERFORMANCE OF SIEVE TRAYS UNDER GS HEAVY WATER PROCESS CONDITIONS., PART II. HIGH PRESSURE OPERATION,
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
Robert G. Garvin, and Edwin R. Norton. Apr 67, 56p
Contract AT (07-2)-1

Descriptors: (*Heavy water, *Chemical engineering), (*Gas flow, *Rainfall), Silicones.

For abstract, see NSA 21 16.
DP-1025-II HC$3.00 MF$0.65

RECOVERY OF URANIUM FROM EBR-I CORE 2 MELTED FUEL,
Idaho Nuclear Corp., Idaho Falls.
For primary bibliographic entry see Field 18J.
For abstract, see NSA 21 16.
IN-1088 HC$3.00 MF$0.65

SPECULATIVE ANALYSIS OF THE COST RELATIONSHIP BETWEEN DESALINATION SYSTEM SIZE AND THE MARKET GROWTH RATE,
Oak Ridge National Lab., Tenn.
C. C. Burwell, and R. A. Ebel. 26 Jan 66, 9p
Contract W-7405-eng-26

Descriptors: (*Desalination, *Costs), (*Distilling plants, Construction), Water supplies, Management engineering, Industrial production.

For abstract, see NSA 21 16.
ORNL-TM-1399 HC$3.00 MF$0.65

ORIC A FORTRAN IV CODE FOR COMPUTING OPTIMUM PLANT DESIGNS FOR THE DESALINATION OF SEAWATER AND THE PRODUCTION OF ELECTRICITY,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18L.
For abstract, see NSA 21 16.
ORNL-TM-1523 HC$3.00 MF$0.65

7B. Inorganic Chemistry

INFRARED SPECTRA OF CHARGE-TRANSFER COMPLEXES. VII. THE SOLID BENZENE-BROMINE COMPLEX,
Iowa Univ Iowa City Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-656 801 Not available from CFSTI.

REACTIONS OF DIATOMIC MOLECULES. IV. KINETICS OF FORMATION OF BROMINE CHLORIDE,
Oregon Univ Eugene Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-656 809 Not available from CFSTI.

DETERMINATION OF FREE CHLORINE BY METHYL ORANGE,
Illinois State Water Survey Urbana
Frank W. Sollo, Jr., and Thurston E. Larson.
1967, 11p Rept no. Ser-55
Prepared for presentation at Annual Conference, Portland, Ore., 28 Jun 1965.
Availability: Published in Journal American Water Works Association, v57 n12 p1575-85 Dec 1965.

Descriptors: (*Water supplies, Colorimetric analysis), (*Chlorine, Colorimetric analysis), (*Chemical indicators, Water supplies), Test methods, Acceptability, Calibration, Water pollution.
Identifiers: Methyl orange.

It was found that the methyl orange test is a satisfactory laboratory and field procedure for determining free and combined chlorine in water samples. The test may theoretically be used to measure chlorine of any concentration; curves have been prepared for concentrations of up to 5.0 mg/l, although precision deteriorates slightly at the higher concentrations. The only serious interference is from manganese, and this can be corrected through the use of an arsenite modification. Results of the methyl orange test on polluted waters agree with those obtained by the amperometric titration method. It is not useful for water containing significant concentrations of bromide ions, because any bromide ions will increase interference by chlorine-ammonia compounds.
AD-656 816 Not available from CFSTI.

EXCHANGE OF FLUORINE IN PHOSPHORUS PENTAFLUORIDE,
National Research Council of Canada Ottawa (Ontario) Div of Applied Chemistry
For primary bibliographic entry see Field 7D.
AD-656 976 Not available from CFSTI.

DEUTERIUM ISOTOPE STUDIES ON 2,3-DICARBAHEXABORANE (8).
Technical rept.,
California State Polytechnic Coll San Luis Obispo
John R. Spielman, Richard Warren, Gary B. Dunks, James E. Scott, Jr., and Thomas Onak.
1 Aug 67, 11p Rept no. TR-14
Contract Nonr-3364 (00)

Descriptors: (*Boranes, Exchange reactions), (*Deuterated compounds, Boranes), Deuterium, Hydrogen, Catalysis, Synthesis (Chemistry), Spectra (Infrared), Nuclear magnetic resonance.
Identifiers: Carboranes, Dicarbahexaboranes.

Deuterium exchange at various positions on the C2B4H8 molecule was studied. D2 exchanges with all boron-bonded hydrogen atoms, and B2D6 in the presence of diglyme exchanges only at the 4-, 6-terminal positions. The (CH3)2C2B4H6-DCl exchange, catalyzed by aluminum chloride, occurs at both apex and base terminal positions. C,C - Dideuterio - 2,3 - dicarbahexaborane (8), D2C2B4H6, was prepared for comparison of the infrared spectrum. (Author)
AD-657 174 HC$3.00 MF$0.65

DOPPLER PROFILES OF THE 5577 A AIRGLOW,
Queen's Univ Belfast (Northern Ireland) Dept of Applied Mathematics
For primary bibliographic entry see Field 4A.
AD-657 266 Not available from CFSTI.

COMMENT ON FLUORINE EXCHANGE IN SULFUR TETRAFLUORIDE,
Utah State Univ Logan Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-657 277 Not available from CFSTI.

THE PHASE AB2 IN THE TERNARY SYSTEMS La-Sb-Te AND La-Sn-Sb,
Texas Univ Austin Dept of Chemical Engineering
For primary bibliographic entry see Field 20B.
AD-657 471 Not available from CFSTI.

BASIC CHEMICAL RESEARCH IN AUSTRALIA,
Queensland Univ Brisbane (Australia) Dept of Chemistry
For primary bibliographic entry see Field 14B.
AD-657 475 Not available from CFSTI.

ON THE INTERACTIONS BETWEEN CARBON MONOXIDE AND TRANSITION METALS.
Commissariat A L Energie Atomique, Saclay (France). Centre D'etudes Nucleaires.
For primary bibliographic entry see Field 7D.
For abstract, see STAR 05 19.
N67-33495 HC$3.00 MF$0.65

ELECTRONIC STRUCTURE OF TRANSITION CARBIDES AND NITRIDES.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 7D.
For abstract, see STAR 05 19.
N67-33967 HC$3.00 MF$0.65

SOLUTION DENSITIES OF SODIUM BROMIDE AS A FUNCTION OF TEMPERATURE AND ANHYDROUS SALT CONTENT,
California Univ., Livermore. Lawrence Radiation Lab.
William L. Robison, and Michael J. P. Weston.
4 May 67, 158p
Contract W-7405-eng-48

Descriptors: (*Sodium compounds, *Bromides), (*Salts, Polynomials), Numerical analysis, Tables, Density.

For abstract, see NSA 21 16.
UCRL-50257 HC$3.00 MF$0.65

7C. Organic Chemistry

BECKMANN FRAGMENTATION OF ALPHA-DIFLUORAMINO FLUORIMINES; A ROUTE TO ALPHA-DIFLUORAMINO FLUORIDES,
Rohm and Haas Co Huntsville Ala Redstone Research Labs
Travis E. Stevens. 7 Apr 67, 4p
Contract DA-01-021-AMC-11536 (Z)
Availability: Published in Tetrahedron Letters n31 p3017-9 1967.

Descriptors: (*Fluoroamines, Chemical reactions), (*Halogenated hydrocarbons, Fluoroamines), Imines, Decomposition, Fluorides, Chlorides, Bromides, Nitriles, Boron compounds.
Identifiers: Difluoramino fluorides.

It is reported that alpha-difluoramino fluorimines in the presence of boron trifluoride in methylene chloride produce alpha-difluoramino fluorides, apparently by way of fragmentation of the fluorimine and trapping of the intermediate alpha-difluoramino carbonium ion by fluoride ion. The yields ranged from 25% to 68%.
AD-656 800 Not available from CFSTI.

PRESSURE EFFECTS ON THE THERMAL DECOMPOSITION OF BETA-CHOLESTANYL S-METHYL XANTHATE,
Utah Univ Salt Lake City Inst for the Study of Rate Processes
For primary bibliographic entry see Field 7D.
AD-656 802 Not available from CFSTI.

REVERSIBLE PHOTOISOMERIZATION OF 1,2-BIS (9-ANTHRYL)-ETHANE,
Minnesota Univ Minneapolis Div of Physical Chemistry
For primary bibliographic entry see Field 7E.
AD-656 805 Not available from CFSTI.

ISOLATION OF HEPTADEC-trans-10-EN-8-YNOIC ACID FROM A SEED OIL,
National Research Council of Canada Ottawa (Ontario) Div of Pure Chemistry
C. Y. Hopkins, A. W. Jevans, and Mary J. Chisholm. 1 May 67, 2p
NRC-9605
Availability: Published in Chemistry and Industry p998-9 Jun 17 1967.

Descriptors: (*Fatty acids, Separation), Vegetable oils, Chemical analysis, Alkynes, Canada.
Identifiers: Heptadecenynoic acids.

A new acetylenic acid, heptadec-trans-10-en-8-ynoic acid, was isolated from rabbit wood (Pyrularia pubera Michx.) seed oil. It was present to the extent of about 6% of the total fatty acids. The name 'pyrulic acid' is proposed.
AD-656 830 Not available from CFSTI.

THE FRANK J. SEILER RESEARCH LABORATORY,
Frank J Seiler Research Lab United States Air Force Academy Colo
For primary bibliographic entry see Field 14B.
AD-657 036 HC$3.00 MF$0.65

SUBSTITUTED BIPHENYLS AND TERPHENYLS AS OXIDATIVELY AUTOINHIBITIVE COMPOUNDS.
Frankford Arsenal Philadelphia Pa Pitman-Dunn Research Labs
For primary bibliographic entry see Field 11H.
AD-657 084 Not available from CFSTI.

METHODS FOR PHOSPHORUS DETERMINATION IN ORGANIC COMPOUNDS ON THE CENTIMILLIGRAM SCALE.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
A. J. Christopher, and T. R. F. W. Fennell. May 67, 19p Rept no. RAE-TR-67115

Descriptors: (*Organic phosphorus compounds, Microanalysis), Colorimetric analysis, Spectroscopy, Decomposition, Combustion, Great Britain.

Four mineralisation procedures and an alternative spectrophotometric finish were assessed by comparison with those of a method previously reported (see PB-169 458) for the determination of phosphorus in organic compounds. It is concluded that this earlier method is superior to all others considered for the analysis of unfluorinated compounds. Suitable, but rather less satisfactory, methods for the determination of phosphorus in fluorocompounds are suggested. (Author)
AD-657 204 HC$3.00 MF$0.65

METHYL CELLULOSE NITRATE.
Technical rept.,
Picatinny Arsenal Dover N J Propellants Lab
Jack Bobinski, and Yvon P. Carignan. Aug 67, 39p
PA-TR-3476

Descriptors: (*Methyl cellulose, Nitration), (*Nitrocellulose, Preparation), (*Solid rocket propellant plasticizers, Materials), Synthesis (Chemistry), Nitric acid, Solvents, Polymerization, Differential thermal analysis, Double base rocket propellants, Explosive materials.
Identifiers: Methyl cellulose nitrates.

Methyl cellulose nitrate was prepared by nitration of methyl cellulose with 98% nitric acid dissolved in methylene chloride and, in 98% nitric acid without a solvent. With both procedures nitration is apparently complete within fifteen minutes. The heterogeneous nature of the methylation resulted in the non-uniformity of the substitution in the product, methyl cellulose nitrate. However, on the basis of the experimental data, it is postulated that methyl cellulose having a minimum degree of substitution of 1.8 would produce a uniformly substituted methyl cellulose nitrate. Nitration of methyl cellulose with a mixture of nitric and sulfuric acids is also discussed. Results of evaluation of the products for military application are presented. (Author)
AD-657 214 HC$3.00 MF$0.65

BORANES AS CARBONIUM ION ANALOGS.
Technical rept.,
Akron Univ Ohio
Brian G. Ramsey. 1967, 8p Rept no. TR-1
Contract N00014-67-A-0116-0001

Descriptors: (*Organoboranes, Chemical properties), Heterocyclic compounds, Synthesis (Chemistry), Molecular spectroscopy, Electron transitions, Molecular orbitals, Spectra (Visible + ultraviolet).
Identifiers: Benzeneboronic acids, Boranorbornanes.

A summary is given of the progress of work involving (1) the synthesis of 2-boranorbornane, and (2) electronic transitions in trialkylboranes and in arylboronic acids.
AD-657 254 HC$3.00 MF$0.65

SOLVOLYSIS OF 9-SUBSTITUTED 10-ANTRHRANYL SYSTEMS,
California Univ Los Angeles Dept of Chemistry
Richard Leute, and S. Winstein. 17 Apr 67, 9p
AROD-3580:29
Grant DA-ARO (D)-31-124-G642
Availability: Published in Tetrahedron Letters n26 p2475-80 1967.

Descriptors: (*Polycyclic compounds, Decomposition), (*Anthracenes, Decomposition), Spiro compounds, Cyclopropanes, Reaction kinetics, Ionization, Molecular isomerism.
Identifiers: Solvolysis.

A solvolytic comparison was made of a spiro-cyclopropane anthranyl system with analogs containing two H atoms, two CH3- groups, or a CH2= group in place of the 9-spiro-cyclopropane group. The results yielded data on the relative ionization rate-enhancing effects of the various substituants; and on the relative kinetic and thermodynamic product control effects of the 9-anthrylmethyl benzyl type caton derived from the methylene case and of the 9-anthrylethyl bridged ion.
AD-657 270 Not available from CFSTI.

BASIC CHEMICAL RESEARCH IN AUSTRALIA,
Queensland Univ Brisbane (Australia) Dept of Chemistry
For primary bibliographic entry see Field 14B.
AD-657 475 Not available from CFSTI.

CONTRIBUTION TO THE STUDY OF THE STRUCTURE AND REACTIVITY OF KETONES USING DEUTERIUM SUBSTITUTION OF THE ALPHA - KETONE HYDROGENS.
Contribution A l'Etude de La Structure Et de La Reactivite des Cetones Par Utilisation de La Substitution Deuteriee des Hydrogenes Alpha-cetoniques
Commissariat A L Energie Atomique, Saclay (France). Centre D'etudes Nucleaires.
G. Frejaville. 1966, 67p CEA-R-2955
in French, English Summary

Descriptors: *Deuterium, *Hydrogen, *Ketone, *Molecular structure, Acetone, Cyclohexanol, Infrared, Molecular, Reactivity, Spectrum, Structure, Substitution, Vibration.

For abstract, see STAR 05 19.
N67-33259 HC$3.00 MF$0.65

7D. Physical Chemistry

STRUCTURE OF RESONANCES IN ELECTRON SCATTERING BY HYDROGEN ATOMS,
California Univ San Diego La Jolla
Joseph C. Y. Chen. 3 Oct 66, 18p
AROD-5133:59-P
Contract DA-31-124-ARO (D)-257, ARPA Order-0570
Availability: Published in The Physical Review v156 n1 p150-64 Apr 5 1967.

Descriptors: (*Hydrogen, Electron bombardment), (*Electrons, *Resonance scattering), Atomic energy levels, Excitation, Wave functions, Probability, Potential scattering, Operators (Mathematics).
Identifiers: Defender project.

A study of the structure of resonances just below the n=2 excitation threshold in electron scattering by hydrogen atoms is carried out by utilizing an approximate method adopted from the projection-operator formalism. Analytic expressions for the level width near the threshold are obtained for both the singlet- and triplet-compound-state series with zero total angular momentum. It is found that the level widths behave like the level spacings in that they decrease exponentially as the levels approach the threshold. Nevertheless, the ratio between the level spacings and widths remains a constant less than 1. It is then concluded from the study that within the approximations adopted in the method, neither the singlet nor triplet series of the compound states become overlapping near the threshold. However, the Lamb shift may, by removing the degeneracy in the n=2 levels, cut off these infinite sequences of compound states, thereby restricting the number of allowed resonances. The interference between potential and resonance scatterings is also examined. (Author)
AD-656 792 Not available from CFSTI.

THEORY OF ATOMIC COLLISIONS WITH NEGATIVE IONS: ASSOCIATIVE DETACHMENT,
California Univ San Diego La Jolla
Joseph C. Y. Chen. 31 Oct 66, 17p
AROD-5133:62-P
Contract DA-31-124-ARO (D)-257, ARPA Order-0570
Availability: Published in The Physical Review v156 n1 p12-25 Apr 5 1967.

Descriptors: (*Gas ionization, Theory), Atoms, Ions, Interactions, Potential energy, Probability, Potential scattering, Resonance scattering, Atomic

energy levels, Nuclear energy levels, Operators (Mathematics).
Identifiers: Defender project.

Consideration is given to the problem of atomic collisions with negative ions and special attention is given to the rearrangement process of associative electron detachment. After the various possible processes, the interaction potentials, and the related problems of potential curves are described physically, a theoretical formulation of the problem is presented, ranging from general formalism to explicit formulas for the reaction cross section and the rate coefficient. In the general formalism, transition matrices are derived for direct and resonance reactions as well as for potential and resonance scatterings. The process of associative detachment is then treated explicitly, using these derived expressions. It is shown that because of the configuration interaction of the electronic motion with continua, the nuclear motion is taking place in a complex potential. The propagation of a nuclear state in such a complex potential is treated in some detail. Various implications of the derived theoretical results are discussed in connection with experimental observations. (Author)
AD-656 793 Not available from CFSTI.

EXCITED-STATE FORMATION AND DESTRUCTION IN MIXTURES OF ATOMIC OXYGEN AND NITROGEN,
Stanford Research Inst Menlo Park Calif
Robert A. Young, and Graham Black. 6 Dec 65, 14p
AROD-3493:9-P
Contract DA-31-124-ARO (D)-104
Availability: Published in The Journal of Chemical Physics v44 n10 p3741-51 May 15 1966.

Descriptors: (*Atomic energy levels, Excitation), (*Oxygen, Atomic energy levels), (*Nitrogen, Atomic energy levels), (*Airglow, Atomic energy levels), Line spectrum, Emissivity, Nitrogen oxides, Reaction kinetics, Concentration (Chemistry), Pressure, Quenching (Inhibition).

Absolute measurements were made of the intensity of emission from atomic oxygen (5577A), molecular oxygen (the Herzberg bands below 4000A, the atmospheric band at 7618A), nitric oxide (the beta bands below 4000A), and molecular nitrogen (the first positive bands from 5000A to 6000A) when excited in a low-pressure gas atmosphere containing atomic nitrogen and/or oxygen in absolutely measured quantities. The relationship between light emission and atomic concentration, pressure, gas mixture, and quenching gas concentration was obtained. With these data as bases, excitation and de-excitation processes are discussed and rate coefficients of several elementary processes deduced. These were applied to nightglow phenomena of the earth's upper atmosphere. (Author)
AD-656 795 Not available from CFSTI.

CONFORMATION OF ADSORBED POLYSTYRENE MEASURED BY ATTENUATED TOTAL REFLECTION IN THE ULTRAVIOLET REGION,
National Bureau of Standards Washington D C Inst for Materials Research
Paul Peyser, and Robert R. Stromberg. 27 Oct 66, 12p
AROD-4253:7
Presented at the National Meeting of the American Chemical Society (152nd), New York, N. Y., Sep 66.
Availability: Published in Journal of Physical Chemistry v71 n7 p2066-74 Jun 1967.

Descriptors: (*Polymers, Stereochemistry), (*Styrenes, *Ultraviolet spectroscopy), Styrene plastics, Films, Adsorption, Substrates, Quartz, Reflection, Refractive index, Concentration (Chemistry), Organic solvents.
Identifiers: Molecular conformations.

A method using the technique of internal reflection spectroscopy is described for the measurement of the extension and concentration of a film on a transparent surface. In this method, attentuated total reflection (ATR) in the ultraviolet region was applied to polystyrene adsorbed on a quartz surface from cyclohexane solution at the theta temperature. The ATR prism, which allowed 15-16 reflections, was constructed from synthetic crystalline quartz. It was designed to be placed in a spectrophotometer without the need of additional optical components. The measured adsorbed polymer 'extension' agreed reasonably well with similar ellipsometric measurements on nearly the same system. The study was restricted to the use of an adsorbed layer that could be treated as a homogeneous film. The possible use of the method to determine the concentration distribution of adsorbed segments normal to the surface is discussed. Measurements in the ultraviolet region of the refractive indexes of the polymer solutions and of the benzene-methanol and toluene-methanol solutions that were used to test the method are also described. (Author)
AD-656 797 Not available from CFSTI.

THERMOCHEMISTRY OF CYANOCARBONS. II. THE HEATS OF COMBUSTION OF PYRIDINIUM DICYANOMETHYLIDE, MALONONITRILE, AND FUMARONITRILE,
Utah State Univ Logan Dept of Chemistry
Richard H. Boyd, K. Ranjan Guha, and Richard Wuthrich. 12 Dec 66, 8p
AROD-4150:4-C
Contract DA-31-124-ARO (D)-458
Availability: Published in Journal of Physical Chemistry v71 n7 p2187-91 Jun 1967.

Descriptors: (*Nitriles, Thermochemistry), (*Heat of combustion, Nitriles), Heat of formation, N-heterocyclic compounds, Heat of vaporization, Chemical bonds, Dissociation, Chemical equilibrium.
Identifiers: Fumaronitriles, Malononitriles, Pyridinium dicyanomethylide.

The heats of formation of solid and gaseous pyridinium dicyanomethylide, malononitrile, and fumaronitrile were determined via the heats of combustion of the solids and their heats of vaporization (from vapor pressure curves). From these data, the thermochemical bond energy of the N (+)-C (-) bond in the ylide id calculated to be 67 kcal/mole. The data for malononitrile and fumaronitrile are used to revise and extend a discussion of the electrostatic and electronic effects of cyano group substitution. The pKa for the dissociation in water of the conjugate acid of the ylide was determined to be -1.5. (Author)
AD-656 799 Not available from CFSTI.

INFRARED SPECTRA OF CHARGE-TRANSFER COMPLEXES. VII. THE SOLID BENZENE-BROMINE COMPLEX,
Iowa Univ Iowa City Dept of Chemistry
Willis B. Person, Courtney F. Cook, and H. Bruce Friedrich. 20 Jul 66, 15p
AROD-1733:28
Grant DA-ARO (D)-31-124-G387
Prepared in cooperation with Florida Univ., Gainesville. Dept. of Chemistry. See also AD-634 888.
Availability: Published in The Journal of Chemical Physics v46 n7 p2521-32 Apr 1 1967.

Descriptors: (*Complex compounds, *Infrared spectroscopy), (*Benzene, Complex compounds), (*Bromine, Complex compounds), Synthesis (Chemistry), Molecular association, Crystal structure, Absorption spectrum.
Identifiers: Charge-transfer complexes.

The infrared spectrum of the solid benzene-Br2 complex was measured to give the changes in frequency and an estimate of the changes in intensity from the pure benzene and pure Br2 crystals. The complex was usually prepared by condensing a 1:1 mixture of benzene and bromine vapor onto a cold plate, but other techniques were also tried, and partial studies are reported. These spectra show definitely that neither the benzene nor bromine molecules in the samples are located on a site possessing a center of symmetry. From the analysis of the spectrum of the complexed benzene, a site symmetry of C3nu is deduced. This apparent contradiction of the results of the x-ray studies of Stromme and Hassel is discussed and reconciled. The frequency shifts and intensity changes on complex formation are discussed in some detail. (Author)
AD-656 801 Not available from CFSTI.

PRESSURE EFFECTS ON THE THERMAL DECOMPOSITION OF BETA-CHOLESTANYL S-METHYL XANTHATE,
Utah Univ Salt Lake City Inst for the Study of Rate Processes
Lin-sen Pan, Terrell N. Andersen, and Henry Eyring. 3 Jan 67, 8p
AROD-2759:14-C
Grant DA-ARO (D)-31-124-G618
Availability: Published in Journal of Physical Chemistry v71 n7 p2258-62 Jun 1967.

Descriptors: (*Organic sulfur compounds, Pyrolysis), Steroids, Esters, Reaction kinetics, Pressure, Alkenes, Thiols, Synthesis (Chemistry), Thermochemistry, Heat of activation, Entropy.
Identifiers: Cholestanyl methyl xanthates, Chugaev reaction.

A study of the thermal decomposition of beta-cholestanyl S-methyl xanthate was made at temperatures of 176-236C and pressures of 1-12,000 atm. The unimolecular decomposition is continuously retarded as the pressure increases and the back reaction is unimportant under the experimental conditions. With increasing pressure the heat of activation increases, the (positive) volume of activation decreases, and the entropy of activation becomes less negative. These effects are discussed on the basis of the reaction occurring by several barriers in parallel, some of which pressure favors more than others. (Author)
AD-656 802 Not available from CFSTI.

ELECTRONIC STRUCTURE OF NITROGEN DIOXIDE, ITS IONS, AND ITS DIMER,
New York Univ N Y Dept of Chemistry
L. Burnelle, P. Beaudouin, and L. J. Schaad. 27 Dec 66, 11p
AROD-5963:3
Contract AF 19 (628)-5729, Grant DA-ARO (D)-31-124-G718
Availability: Published in The Journal of Physical Chemistry v71 n7 p2240-7 Jun 1967.

Descriptors: (*Nitrogen oxides, *Molecular orbitals), Molecular energy levels, Excitation, Chemical bonds, Configuration, Electron transitions, Dissociation, Heat of reaction.

The extended Huckel method was applied to nitrogen dioxide for a series of bond angles extending from 90 to 180 deg. and for three values (1.50, 1.75, and 2.00) of the parameter K appearing in the Wolfsberg-Helmholtz formula. For K = 2.00, very good agreement with experiment is obtained for the bond angle of NO2 (-), NO2, and NO2 (+), while the experimental bending force constants are reproduced in a satisfactory fashion. Comparison is made between Walsh's diagram for AB2 molecules and the curves obtained for the orbital energies. The adiabatic ionization potential of NO2 is found equal to 10.98 ev, which coincides with a recent experimental determination by photoelectron spectroscopy. The first excited state of NO2 (+) is predicted to be bent. It is found that upon dimerization all the occupied b2 orbitals of NO2 give rise to some destabilization; this is suggested to be the reason for the low dissociation energy of the dimer. The loss of color associated

with the dimerization appears to be linked with the stabilization incurred by the 4a1 orbital of NO2. (Author)
AD-656 804 Not available from CFSTI.

THE EFFECT OF MOLECULAR WEIGHT ON THE CRYSTALLIZATION AND MELTING OF LONG-CHAIN MOLECULES,
Florida State Univ Tallahassee
Leo Mandelkern. 1967, 8p
AROD-4222:14
Grant DA-ARO (D)-31-124-G788
Availability: Published in Journal of Polymer Science n18 ptC p51-5 1967.

Descriptors: (*Polymers, *Molecular weight), (*Polyethylene plastics, Molecular weight), Crystallization, Melting point, Density, Heat of fusion, Enthalpy, Fracture (Mechanics), Electron microscopy, Crystal structure.

The effect of molecular weight on the properties of bulk-crystallized polymers was studied. Particular emphasis was given to certain thermodynamic properties as the melting temperature, density, and enthalpy of fusion, to mechanical properties such as fracture, and to crystallite sizes as determined from electron microscope examination of replicas of fracture surfaces. Major attention was given to molecular weight fractions of linear polyethylene, encompassing the molecular weight range 3,000 to 1,750,000, which were crystallized isothermally from the pure melt at atmospheric pressure at low undercoolings for long periods of time. (Author)
AD-656 806 Not available from CFSTI.

REACTIONS OF DIATOMIC MOLECULES. IV. KINETICS OF FORMATION OF BROMINE CHLORIDE,
Oregon Univ Eugene Dept of Chemistry
Peter R. Walton, and Richard M. Noyes. 5 Dec 66, 4p
AROD-3698:6
Grant DA-ARO (D)-31-124-G833
See also AD-644 316.
Availability: Published in The Journal of Physical Chemistry v71 p1952-3 1967.

Descriptors: (*Diatomic molecules, Chemical reactions), (*Bromine compounds, Reaction kinetics), (*Chlorides, Reaction kinetics), Bromine, Chlorine, Synthesis (Chemistry), Heat of activation.
Identifiers: Bimolecular reactions, Bromine chloride.

Evidence is presented which indicates the formation of bromine chloride from its elements takes place by a bimolecular mechanism. An activation energy of 17 kcal/mole was found, which is in good agreement with the value predicted in AD-644 314.
AD-656 809 Not available from CFSTI.

THERMAL MUTAROTATION IN POLYCRYSTALLINE ALPHA-D-GLUCOSE,
British Columbia Univ Vancouver Dept of Chemistry
Richard E. Pincock, and Thomas E. Kiovsky. 27 Oct 66, 6p
AFOSR-67-1850
Grant AF-AFOSR-1102-66
Availability: Published in Chemical Communications p864-6 1966.

Descriptors: (*Glucose, *Molecular rotation), Reaction kinetics, Thermochemistry, Crystals, Optical properties.

The kinetic features of the mutarotation of polycrystalline samples of alpha-D-glucose below its melting point were investigated. The observed specific rotations at various times were independent of sample size and largely independent of crystal size and the origin of the glucose. A seven fold increase in initial rate constants was observed for a four degree temperature change from 140 to 144 degrees centigrade. (Author)
AD-656 850 Not available from CFSTI.

PROCEEDINGS OF THE SYMPOSIUM ON THE STRUCTURE OF SURFACES, ARMY RESEARCH OFFICE, DURHAM, NORTH CAROLINA, 8-9 NOVEMBER 1966,
Army Research Office Durham N C
For primary bibliographic entry see Field 20B.
AD-656 874 Not available from CFSTI.

DIRECT OBSERVATION OF THE INFRARED TORSIONAL SPECTRUM OF C2H6, CH3CD3 AND C2D6.
Technical rept.,
Princeton Univ N J Frick Chemical Lab
Shmuel Weiss, and George E. Leroi. Jul 67, 24p
Rept no. TR-25
Contract Nonr-1858 (27)
Availability: Published in Journal of Chemical Physics.

Descriptors: (*Alkanes, *Infrared spectroscopy), Deuterated compounds, Band spectrum, Potential energy, Interactions, Chemical bonds, Torsion, Selection rules.
Identifiers: Ethanes.

The torsional spectra of gaseous C2H6, CH3CD3 and C2D6 were observed directly in the infrared under high pressure x path-length conditions (30-70 atm. meters). The fundamental was observed for all three species, at 289, 253 and 208/cm respectively. Hot bands were observed for C2H6 (255/cm (A), 258/cm (E)) and CH3CD3 (228/cm) as was the first overtone for CH3CD3 (482/cm). All the experimental frequencies can be very well accounted for by use of a single internal rotation potential function with a barrier height V3 = 2928 cal/mole. This implies that V6 (and higher terms) are negligibly small. Two alternative explanations for the occurrence of these spectra in the infrared, one in terms of Coriolis interaction with an infrared active vibration and one in terms of a nu-4 + nu-x - nu-x vibration, are discussed. A more reliable determination of nu-12, the 'uncertain frequency' of C2H6, was obtained from the nu-12 - nu-9 difference band, giving nu-12 = 1206/cm. (Author)
AD-656 908 Not available from CFSTI.

A NEW PREDISSOCIATION OF THE H2 MOLECULE,
National Research Council of Canada Ottawa (Ontario)
G. Herzberg. 27 Mar 67, 10p Rept no. NRC-9562
Availability: Published in Science of Light v16 n1 p14-21 1967.

Descriptors: (*Hydrogen, Dissociation), (*Molecular spectroscopy, Hydrogen), Molecular energy levels, Excitation, Spectra (Visible + ultraviolet), Absorption spectrum, Emissivity, Gas discharges, Lasers, Canada.

The absorption spectrum in the visible region of H2 excited by a flash discharge was investigated. Bands of the triplet systems j (3)delta-g - c (3)Pi-u, i (3)Pi-g - c (3)Pi-u, and g (3)sigma-g (+) - c (3)Pi-u appear prominently in absorption, but with an anomalous intensity distribution: one lambda component is very weak or missing. This anomaly can be readily accounted for when it is realized that 'half' the c (3)Pi-u state can predissociate into the b (3)sigma-u (+) state arising from normal atoms. In emission the lines that are weak in absorption are anomalously strong. Part of this latter effect may simply be due to reabsorption of the lines that are strong in absorption. However, it appears likely that another part of this anomaly may be due to the inverted populations produced by the predissociation and the resulting induced emission, i.e., laser action. (Author)
AD-656 949 Not available from CFSTI.

THE ANODIC DEPOSITION OF IRON OXIDE FILMS ON IRON,
National Research Council of Canada Ottawa (Ontario) Div of Applied Chemistry
V. Markovac, and M. Cohen. 25 Jul 66, 7p
NRC-9628
Availability: Published in Journal of the Electrochemical Society v114 n7 p674-8 Jul 1967.

Descriptors: (*Iron oxides, *Electrodeposition), Iron, Oxidation, Electrochemistry, Reaction kinetics, Thickness, Concentration (Chemistry), Canada.

The anodic deposition of iron oxide films on passive iron polarized at +300 mv in boric acid/sodium borate solutions, at pH 7.52, containing ferrous ions has been investigated. The deposition takes place with a current efficiency of 100% based on the reaction Fe (++) (l) - e (-)o to Fe (+++) (s). The kinetics of the anodic deposition could be divided into two consecutive regions, an initial stage characterized by the formation of a film with the thickness of a unit cell, followed by a steady growth region where the rate of deposition is dependent on the ferrous ion concentration in the solution and the oxide layer thickness. Both the anodic current densities and the cathodic reduction behavior indicate that the deposited iron oxide film is different from the film formed by anodic oxidation of metallic iron in terms of both electronic conductivity and chemical composition. (Author)
AD-656 955 Not available from CFSTI.

EXCHANGE CONTRIBUTION IN THE SCATTERING OF ELECTRONS BY ATOMS AND POSITIVE IONS,
Joint Inst for Lab Astrophysics Boulder Colo
O. Bely. 24 Sep 66, 25p
AROD-4445:47
Contract DA-31-124-ARO (D)-139, ARPA Order-492
Availability: Published in Il Nuovo Cimento v49 Ser10 p66-86 1967.

Descriptors: (*Atomic energy levels, Excitation), (*Electrons, Scattering), Atoms, Ions, Electron bombardment, Silicon, Carbon, Matrix algebra, Approximation (Mathematics).
Identifiers: Exchange scattering, R-matrix.

The Ochkur approximation for the exchange scattering amplitude is discussed as well as the modification proposed by Rudge. While Ochkur's approximation cannot be obtained from a variational expression, the expression given by Rudge does not satisfy the detailed balance principle. Two approximations are then proposed for the exchange contribution to the T-matrix occuring in the scattering of electrons by neutral atoms and positive ions. The first approximation (E I) does not take account of the flux conservation but satisfies the principle of the detailed balance. The second one (E II) satisfies this principle and also insures the flux conservation. Both approximations are then applied to the calculation of the cross-section Q ((3)P to (1)D) in the ground configuration of the silicon and carbon series. Comparison with previous calculations is fairly satisfactory. It appears that for the highly ionized ions the main contribution is not due to the angular momentum l = 1 but to the first four angular momenta. Finally, the algebraic coefficients entering in the calculation of the exchange part of the R matrix are given in the case of one- and two-electron atoms and ions as well as for the transitions occurring between the l (n) configurations. (Author)
AD-656 958 Not available from CFSTI.

SYMMETRIC-RESONANCE CHARGE TRANSFER IN Ar FROM 0.1-20 eV USING MERGING BEAMS,
General Dynamics/Convair San Diego Calif Space Science Lab
R. H. Neynaber, S. M. Trujillo, and Erhard W. Rothe. 23 Dec 66, 3p
Research supported in part by Advanced Research Projects Agency.
Availability: Published in Physical Review v157 n1 p101-2 May 1967.

Descriptors: (*Ion beams, Argon), (*Molecular beams, Argon), (*Argon, Exchange reactions), Gas ionization, Probability, Interactions, Instrumentation.
Identifiers: Defender project.

The absolute cross section for Ar (+) + Ar to Ar + Ar (+) at an interaction energy W of 0.3 eV was measured using a previously described merging-beams technique. A modification of this method was employed to measure relative cross sections for the same process in a range of W from 0.1 to 20 eV. The results are in agreement with the theoretical prediction of Rapp and Francis. (Author)
AD-656 964 Not available from CFSTI.

APPLICATIONS OF NON-UNIFORM ELECTRIC FIELDS. PART I. ELECTROPHORETIC EVALUATION OF ADSORPTION,
California Univ Los Angeles Brain Research Inst
Rafael Elul. 29 Apr 66, 10p
AFOSR-67-1871
Contract AF 49 (638)-1387, Grant PHS-NB-01883
Availability: Published in Transactions of the Faraday Society v62 n528 Pt 12 p3484-92 Dec 1966.

Descriptors: (*Electric fields, Interactions), (*Electrophoresis, Adsorption), (*Adsorption, Electrochemistry), Electrical double layer, Dipole moments, Electrostatics, Drag, Interfaces.

An electric field of uniform intensity can only induce movement of net electric charge. Fields having non-uniform spatial distribution, on the other hand, will also interact with oriented symmetric distributions of opposing charges, such as dipole layers. The paper is concerned with the possibility of determining potential differences between two phases with the aid of a non-uniform electric field. A general solution is first given for the force exerted on a charge distribution containing free charge, as well as a dipole layer, in a non-uniform electric field. Application to the determination of the contribution of adsorbed ions to the Volta potential is then indicated, and a numerical solution for a sphere of any given conductance is given in the appendix. (Author)
AD-656 974 Not available from CFSTI.

EXCHANGE OF FLUORINE IN PHOSPHORUS PENTAFLUORIDE,
National Research Council of Canada Ottawa (Ontario) Div of Applied Chemistry
S. Brownstein. 8 Nov 66, 4p
NRC-9435
Availability: Published in Canadian Journal of Chemistry v45 p1711-3 1967.

Descriptors: (*Fluorides, *Nuclear magnetic resonance), (*Phosphorus compounds, Nuclear magnetic resonance), Absorption spectrum, Solubility, Vapor pressure, Organic solvents, Interactions, Canada.
Identifiers: Phosphorus pentafluoride.

Fluorine magnetic resonance evidence is presented which supports an intramolecular fluorine exchange process in phosphorus pentafluoride. It is suggested that the mechanism for this process is an intermolecular interaction.
AD-656 976 Not available from CFSTI.

A CALCULATION OF THE COHESIVE ENERGY AND ELASTIC CONSTANTS OF MgO,
Uppsala Univ (Sweden) Inst of Physics
For primary bibliographic entry see Field 20K.
AD-656 981 Not available from CFSTI.

CORRELATION BETWEEN THE PHOTOCHEMISTRY AND THE MASS SPECTRA OF PYRUVIC ACID AND ISOPROPYL PYRUVATE,
Columbia Univ New York Dept of Chemistry
Nicholas J. Turro, David S. Weiss, William F. Haddon, and F. W. McLafferty. 1 May 67, 4p
AFOSR-67-1847
Grant AF-AFOSR-1000-66
Prepared in cooperation with Purdue Univ., Lafayette, Ind., Dept. of Chemistry.
Availability: Published in Journal of the American Chemical Society v89 n13 p3370-1 Jun 21 1967.

Descriptors: (*Pyruvates, *Molecular energy levels), (*Pyruvic acid, Molecular energy levels), (*Mass spectroscopy, Pyruvates), (*Photochemistry, Pyruvates), Photolysis, Excitation, Ionization, Mass spectrum.
Identifiers: Isopropyl pyruvates.

The remarkable situation in which unusual behavior of two molecular ions generated in the mass spectrometer is paralleled by unusual behavior of two corresponding n,pi* excited states is reported. Pyruvic acid and isopropyl pyruvate are the compounds studied. These results indicate the power of using mass spectrometry to elucidate photochemical mechanisms and vice-versa. (Author)
AD-656 982 Not available from CFSTI.

DEVELOPMENT OF HIGH TEMPERATURE THERMAL CONDUCTIVITY STANDARDS,
Little (Arthur D) Inc Cambridge Mass
For primary bibliographic entry see Field 20M.
AD-657 024 HC$3.00 MF$0.65

THE FRANK J. SEILER RESEARCH LABORATORY,
Frank J Seiler Research Lab United States Air Force Academy Colo
For primary bibliographic entry see Field 14B.
AD-657 036 HC$3.00 MF$0.65

ADSORPTION ON NIOBIUM (110), TANTALUM (110), AND VANADIUM (110) SURFACES,
Aerospace Research Labs Wright-Patterson AFB Ohio
Trice W. Haas, Allen G. Jackson, and Michael P. Hooker. 10 Oct 66, 13p Rept no. ARL-67-0153
Availability: Published in The Journal of Chemical Physics v46 n8 p3025-33 Apr 15 1967.

Descriptors: (*Refractory metals, *Chemisorption), (*Niobium, Chemisorption), (*Tantalum, Chemisorption), (*Vanadium, Chemisorption), Carbon monoxide, Oxygen, Electron diffraction analysis, Oxides, Crystal lattices.
Identifiers: Surface chemistry.

Clean surfaces of Nb (110), Ta (110), and V (110) were prepared by heating in an ultrahigh-vacuum environment. Low-energy, electron-diffraction measurements indicated that all clean surfaces were the same as an ideal (110) plane in the bulk to within experimental error. Adsorption of CO and O2 on the clean surfaces of these metals led to similar patterns suggesting that the same structures formed on all three metals. The patterns obtained from adsorption of CO followed by warming to about 400C were the same as those obtained by room-temperature exposure to O2. This suggests decomposition of the adsorbed CO. At least three different structures of O2 on these metals are produced as coverage is increased. Unfortunately, dissolution of the O2 into the bulk prevents accurate determination of surface coverage and this, coupled with the inability to handle intensity-distribution curves effectively, made complete structure determinations of these oxides impossible. (Author)
AD-657 064 Not available from CFSTI.

ANOMALOUS BEHAVIOR OF THE RESISTIVITY OF SOME DONOR-ACCEPTOR COMPLEXES,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
A. Ottenber, and M. E. Browne. 1967, 15p
Availability: Published in Journal of Polymer Science n17 ptC p135-49 1967.

Descriptors: (*Complex compounds, Resistance (Electrical)), Metalorganic compounds, Iron compounds, Cobalt compounds, Nitriles, Organic nitrogen compounds, Polycyclic compounds, Amines, Pressure, Electric fields, Crystal lattices, Paramagnetic resonance, Spectroscopy, Nitrobenzenes.
Identifiers: Charge-transfer complexes, Bis (tetrahydroindenyl) iron, Dicyclopentadienyl cobalt, Dinitro durenes, Phenylene diamines, Tetracyanoethylenes.

The d.c. resistivity was determined as a function of pressure and electric field for the (1:1) donor-acceptor complexes, (I) bis (tetrahydroindenyl)iron: tetracyanoethylene, (II) cobaltocene:tetracyanoethylene, and (III) p-phenylenediamine: dinitrodurene. For I, II, and III the resistivity increases with increasing pressure in a reversible manner over the pressure range 260-2600 psi. For I and III the resistivity increases with increasing electric field; this behavior is essentially reversible except for the presence of a relaxation process. The phenomena are interpreted in terms of a mechanism involving slight reorientation of the molecular units in the crystal lattice similar to the processes responsible for ferrelectric behavior. The observation of these phenomena is assumed to have significant importance in terms of providing systems for the study of the effects of molecular arrangement in crystals upon the conduction mechanisms. (Author)
AD-657 068 Not available from CFSTI.

SALT EFFECT IN DISTILLATION: A LITERATURE REVIEW.
Revised ed.,
Royal Military Coll of Canada Kingston (Ontario) Dept of Chemistry and Chemical Engineering
W. F. Furter, and R. A. Cook. 10 May 66, 15p
Contract DRB-9530-40
Revision of manuscript received 13 Jan 66.
Availability: Published in Int. J. Heat Mass Transfer v10 p23-36 1967.

Descriptors: (*Distillation, *Salts), Solutions, Phase studies, Separation, Vapor pressure, Electrolytes, Complex compounds, Reviews, Canada.

A salt dissolved in a mixed solvent is capable, through preferential association in the liquid phase, of altering the composition of the equilibrium vapour phase. Hence salt effect on vapour-liquid equilibrium relationships provides a potential technique of extractive distillation for systems difficult or impossible to separate by normal rectification. The literature pertaining to salt effect in vapour-liquid equilibrium and in extractive distillation is reviewed. (Author)
AD-657 081 Not available from CFSTI.

THE RELATIVE IMPORTANCE OF BROWNIAN DIFFUSION AND OTHER FACTORS IN AEROSOL FILTRATION.
Electronic Systems Div L G Hanscom Field Mass Decision Sciences Lab
For primary bibliographic entry see Field 15B.
AD-657 082 Not available from CFSTI.

VIBRATIONAL ANALYSIS OF 13C16O,
Group for the Advancement of Spectroscopic Methods Paris (France)
Alain Chedin. 15 Feb 67, 34p Rept no. Scientific-1 AFCRL-67-0321
Contract AF 61 (052)-911

Descriptors: (*Carbon dioxide, Spectroscopy), Isotopes, Spectra (Infrared), Molecular energy levels, Vibration, Rotation, France.

The report refers to the determination of the vibrational and potential constants for the symmetric isotopic species of CO2 except 12C16O2.
AD-657 085 HC$3.00 MF$0.65

STRENGTHS, WIDTHS, AND SHAPES OF THE LINES OF THE 3nu CO BAND.
Scientific rept.,
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
Darrell E. Burch, and David A. Gryvnak. 10 Mar 67, 39p Rept no. U-3972
Contract Nonr-3560 (00), ARPA Order-237

Descriptors: (*Carbon monoxide, *Infrared spectroscopy), Band spectrum, Absorption spectrum, Wave transmission, Emissivity, Nitrogen, Combustion products, Planetary atmospheres, Solar spectrum.

Spectral curves of several CO samples were used to investigate the 3nu band whose center is near 6350/cm. The strength of the band for the common C12O16 isotope was found to be 0.0130 plus or minus 0.0005 atm/cm (STP)/cm. An empirical equation, Fm = 1 + 0.011 m was derived to account for the influence of vibration-rotation on line strengths. The half-widths of the self-broadened lines at 1 atm pressure vary from approximately 0.090/cm at an absolute value of m = 1 to 0.062/cm at an absolute value of m = 20. The widths of self-broadened lines are 1.08 plus or minus 0.005 times as great as N2-broadened lines at the same pressure. The Lorentz line shape appears to be appropriate for the collision-broadened lines within a few/cm of their centers; but the extreme wings of the lines are sub-Lorentzian. (Author)
AD-657 114 HC$3.00 MF$0.65

ABSORPTION BY CO2 BETWEEN 1800 AND 2850/cm (3.5-5.6 MICRONS).
Scientific rept.,
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
David A. Gryvnak, Richard R. Patty, Darrell E. Burch, and Earl E. Miller. 15 Dec 66, 43p Rept no. U-3857
Contract Nonr-3560 (00), ARPA Order-23/1

Descriptors: (*Carbon dioxide, *Infrared spectroscopy), Absorption spectrum, Wave transmission, Pressure, Argon, Neon, Planetary atmospheres, Tables.

Transmission spectra in the 1800-2850/cm region were obtained for more than 100 samples of CO2 and CO2 mixed with N2 and A. The spectral resolution was 2.5/cm. Sample pressures varied from 0.0055 to 742 torr with absorber thicknesses covering the range from 0.081 to 84,400 atm cm. Spectra of several samples at the lower pressures show the effect of Doppler broadening. Measurements in the 2400-2560/cm region provide information about the absorption by the extreme wings of collision-broadened lines. Replotted transmission spectra and extensive tables of integrated absorptance for 116 samples are included. (Author)
AD-657 115 HC$3.00 MF$0.65

ABSORPTION BY CO2 BETWEEN 7125 AND 8000/cm (1.25-1.40 MICRONS).
Scientific rept.,
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
Darrell E. Burch, David A. Gryvnak, and Richard R. Patty. 10 Feb 67, 19p Rept no. U-3930
Contract Nonr-3560 (00), ARPA Order-237

Descriptors: (*Carbon dioxide, *Infrared spectroscopy), Band spectrum, Absorption spectrum, Wave transmission, Pressure, Intensity, Tables, Planetary atmospheres.

Transmission spectra in the 7125-8000/cm region were obtained for CO2 samples with absorber thicknesses as great as 218,000 atm cm (STP). Three absorption bands not observed previously were identified, and the strengths of several bands were determined. Transmission spectra and a table of integrated absorptance versus wavenumber are included for five representative samples. (Author)
AD-657 116 HC$3.00 MF$0.65

SPECTROSCOPY OF EDA COMPLEXES AT HIGH PRESSURES. IV. ABSORPTION OF SEVERAL HALOQUINONE COMPLEXES IN POLYMER MATRICES,
Technical rept.,
California Univ Santa Barbara Dept of Chemistry
H. W. Offen, and T. T. Nakashima. Aug 67, 24p Rept no. TR-5
Contract N00014-67-A-0120-0001

Descriptors: (*Complex compounds, Spectroscopy), (*Quinones, Complex compounds), High-pressure research, Oxidation-reduction reactions, Embedding substances, Cellulose acetate, Acrylic resins, Fluorine compounds, Chlorine compounds, Bromine compounds, Nitriles, Band spectrum, Molecular energy levels, Polycyclic compounds.
Identifiers: Charge-transfer complexes.

Several haloquinone complexes were subjected to high pressures (0-20 kbar), and the resulting effects were registered in the charge transfer (CT) absorption spectra. The observed shift in the CT band maxima are discussed in terms of the various interaction terms, including CT forces, which contribute to the displacement of the ground relative to the excited CT state of the EDA-complex. The results indicate that the stronger complexes show the smaller red shiftor even a blue shift in this pressure range. CT intensities in the 1-20 kbar interval are observed to change by -15% to +40% in this group of related complexes. (Author)
AD-657 122 HC$3.00 MF$0.65

SPECTROSCOPY OF EDA COMPLEXES AT HIGH PRESSURES. V. ABSORPTION OF CRYSTALLINE TCNE COMPLEXES.
Technical rept.,
California Univ Santa Barbara Dept of Chemistry
A. H. Kadhim, and H. W. Offen. Aug 67, 18p Rept no. TR-6
Contract N00014-67-A-0120-0001
See also AD-657 123.

Descriptors: (*Complex compounds, Spectroscopy), (*Nitriles, Complex compounds), High-pressure research, Oxidation-reduction reactions, Embedding substances, Sodium chloride, Aromatic compounds, Naphthalenes, Benzenes, Phenanthrenes, Polycyclic compounds, Band spectrum, Molecular energy levels.
Identifiers: Charge-transfer complexes, Durenes, Hexamethyl benzene, Pyrenes, Tetracyanoethylenes.

Five aromatic hydrocarbon-tetracyanoethylene (TCNE) complexes were dispersed in sodium chloride pellets and subjected to high pressures (0-25 kbar). The charge transfer absorption was enhanced and displaced toward lower energies at the highest pressure. An exception is the crystalline complex HMB-TCNE which exhibits a blue shift at the highest pressure. The doublet structure in both charge transfer bands of naphthalene-TCNE can be observed at 1 atm and at at higher pressures. The importance of the relative sizes of donor and acceptor in environmental interactions are discussed. (Author)
AD-657 123 HC$3.00 MF$0.65

INTERFACIAL FACTORS IN EVAPORATOR SURFACE FOULING: A STATE-OF-THE-ART SURVEY.
Navy Marine Engineering Lab Annapolis Md
For primary bibliographic entry see Field 13A.
AD-657 127 HC$3.00 MF$0.65

VIBRATIONAL RELAXATION IN CO2/D2O MIXTURES,
Mississippi Univ University
F. Douglas Shields, and James Alton Burks. 15 Aug 67, 22p
Contract Nonr-3078 (01)
Rept. on Proj. Thermal Relaxation Processes in Gases.

Descriptors: (*Carbon dioxide, Relaxation time), Molecular energy levels, Excitation, Attenuation, Water vapor, Heavy water, Sound, Absorption, Velocity, Ultrasonic radiation, Interactions, Molecular spectroscopy.
Identifiers: Sonochemistry.

Sound absorption and velocity measurements were made in carbon dioxide/heavy water mixtures at 300, 400, and 500K. The results show that D2O is from 1/3 to 1/5 as efficient as H2O in de-exciting the bending mode vibration of CO2 in a molecular collision. The collision efficiency of D2O for de-exciting CO2 decreases with temperature at an even greater rate than does that of H2O. The large difference between D2O and H2O invalidates the chemical affinity explanation of effect of H2O on CO2. An approximate semi-classical calculation of the transition probability indicates that it is possible to attribute the relaxation to an interchange between the vibration of the CO2 and the rotation of the H2O or D2O. (Author)
AD-657 198 HC$3.00 MF$0.65

MEASUREMENT OF RELAXATION TIMES OF CONCENTRATION FLUCTUATIONS BY THE ELECTRIC FIELD EFFECT ON CRITICAL OPALESCENCE.
Final rept. 1 Jun 66-1 Aug 67,
Cornell Univ Ithaca N Y Dept of Chemistry
Peter J. W. Debye, and Claude C. Gravatt. 1 Aug 67, 9p
Contract Nonr-401 (58)

Descriptors: (*Solutions, *Optical phenomena), Electric fields, Transition temperature, Mixtures, Free energy, Relaxation time, Osmotic pressure, Light, Scattering.
Identifiers: Critical opalescence.

A brief summary is given of work involving (1) a study of the effect of applying electric fields to a binary liquid mixture near its critical solution temperature, Tc; (2) the angular dependence of experimental relaxation times in binary liquid systems; and (3) the scattering of light by binary liquid mixtures below Tc along the coexistance curve. Many aspects of this work were reported in detail in AD-642 606 and AD-649 343.
AD-657 208 HC$3.00 MF$0.65

A COLLECTION OF SOME CONTROLLED SURFACE THERMAL ACCOMMODATION COEFFICIENT MEASUREMENTS,
Missouri Univ Columbia Physical Chemical Lab
For primary bibliographic entry see Field 20D.
AD-657 242 Not available from CFSTI.

APPLICATION OF HIGH-TEMPERATURE SOLUTION CALORIMETRY TO OXIDE SYSTEMS,

Chicago Univ Ill Dept of Chemistry
For primary bibliographic entry see Field 11B.
AD-657 268 Not available from CFSTI.

SOLVOLYSIS OF 9-SUBSTITUTED 10-ANTHRANYL SYSTEMS,
California Univ Los Angeles Dept of Chemistry
For primary bibliographic entry see Field 7C.
AD-657 270 Not available from CFSTI.

KINETIC THEORY OF HEAT TRANSFER FOR A GAS WITH INTERNAL DEGREES OF FREEDOM,
Brown Univ Providence R I Div of Engineering
For primary bibliographic entry see Field 20M.
AD-657 273 Not available from CFSTI.

COMMENT ON FLUORINE EXCHANGE IN SULFUR TETRAFLUORIDE,
Utah State Univ Logan Dept of Chemistry
R. L. Redington, and C. V. Berney. 26 Jul 66, 5p
AROD-5272:5
Contract DA-31-124-ARO (D)-283
Availability: Published in Journal of Chemical Physics v46 n7 p2862-4 Apr 1 1967.

Descriptors: (*Fluorides, Exchange reactions), (*Sulfur compounds, Fluorides), Chemical bonds, Nuclear magnetic resonance, Catalysis, Complex compounds.
Identifiers: Sulfur tetrafluoride.

Justification is made of a proposed mechanism for axial-equatorial fluorine exchange in SF4 (Redington and Berney, J. Chem. Phys. v43 p2020 1965) by answer to a criticism of this mechanism made by Muetterties and Phillips (J. Chem. Phys. v46 p2862 1967).
AD-657 277 Not available from CFSTI.

CONFORMATION OF POLYSTYRENE ADSORBED ON LIQUID MERCURY,
National Bureau of Standards Washington D C Inst for Materials Research
Robert R. Stromberg, and Leslie E. Smith. 7 Nov 66, 9p
AROD-4252:8
Availability: Published in Journal of Physical Chemistry v71 n8 p2470-4 Jul 1967.

Descriptors: (*Styrenes, Adsorption), (*Polymers, Stereochemistry), Styrene plastics, Films, Mercury, Surfaces, Molecular weight, Free energy.
Identifiers: Surface chemistry.

Measurement of the extension of polystyrene adsorbed on liquid mercury from cyclohexane near the theta temperature indicates that the molecule is attached at a relatively large number of sites and that the conformation remains constant during most of the adsorption period. In addition, the extension is approximately independent of molecular weight for the range studied (537,000-3,300,000). These results are in contrast to previous measurements on polycrystalline metallic surfaces. The behavior may be attributed in part to the large value of the contribution of the London dispersion forces to the surface free energy of mercury as compared to other metals. Other possibilities are also discussed. (Author)
AD-657 279 Not available from CFSTI.

THE SELECTION OF OPTIMUM CONDITIONS FOR SPECTROCHEMICAL METHODS. III. SENSITIVITY OF ATOMIC FLUORESCENCE, ABSORPTION, AND EMISSION FLAME SPECTROMETRY,
Florida Univ Gainesville
M. L. Parsons, W. J. McCarthy, and J. D. Winefordner. 1967, 11p
AFOSR-67-1920
Grant AF-AFOSR-1033-66
Availability: Published in Journal of Chemical Education v44 p214-22 Apr 1967.

Descriptors: (*Spectroscopy, Optimization), (*Atomic spectroscopy, Sensitivity), Flames, Fluorescence, Absorption spectrum, Emissivity, Continuous spectrum, Concentration (Chemistry), Resolution, Instrumentation.

Using previously presented expressions for the limiting detectable atomic concentration (and sample solution concentration aspirated into the flame gases) in atomic emission, atomic absorption, and atomic fluorescence flame spectrometry, it is possible to compare directly the calculated limiting detectable atomic concentrations for these three flame spectrometric methods under any experimental conditions. It is the purpose of the paper to demonstrate that this comparison will provide the spectroscopist and analyst with the facility to: (1) choose the most sensitive flame spectrometric method for a given analysis; (2) choose the most sensitive instrument for the given analysis once the method has been chosen; and (3) choose the optimum experimental conditions for the analysis once the method and instrument have been chosen. Specifically the influence of the following factors on the minimum detectable atomic concentration were studied: influence of source intensity and source intensity flicker in atomic fluorescence and atomic absorption flame spectrometry; influence of flame background and flame background flicker in all types of flame spectrometry; influence of instrumental factors such as monochromator slit width, amplifier-readout type, flame size, and flame temperature in all flame methods; and influence of power efficiency in atomic fluorescence.
AD-657 284 Not available from CFSTI.

TRACE ANALYSIS OF SOLIDS BY MASS SPECTROMETRY.
RCA Labs Princeton N J
For primary bibliographic entry see Field 14B.
AD-657 334 HC$3.00 MF$0.65

LIGHT SCATTERING BY BANDED SPHERULITES.
Massachusetts Univ Amherst Polymer Research Inst
For primary bibliographic entry see Field 20C.
AD-657 351 HC$3.00 MF$0.65

THE DICHROISM AND BIREFRINGENCE OF POLYMERS CONTAINING POLYENE SEGMENTS. PART I.
Technical rept.,
Massachusetts Univ Amherst Polymer Research Inst
Y. Shindo, and R. S. Stein. Jul 67, 25p Rept no. TR-91
Contract Nonr-3357 (01)

Descriptors: (*Polymers, Optical properties), Molecular structure, Statistical distributions, Elastomers, Elongation, Polarization, Absorption spectrum, Refractive index, Refraction.
Identifiers: Dichroism.

An extension of the Kuhn-Grun theory of birefringence of ideal rubbers is carried out where a distribution of statistical segment lengths is permitted. It is shown that at a given elongation, longer statistical segments will be oriented more highly than shorter ones. The application of the model to the dichroism of rubber-like networks is discussed. It is shown that the dichroism measurement may give a different measure of orientation than birefringence since it may arise from certain segments of the chain which are of different length from those contributing to birefringence. (Author)
AD-657 352 HC$3.00 MF$0.65

CHEMICAL REACTIONS ON CLEAN SURFACES, USING MODULATED ATOMIC BEAM TECHNIQUES.
Annual technical summary rept. 1 Apr 66-31 Mar 67,
General Dynamics San Diego Calif General Atomic Div
R. L. Palmer, J. N. Smith, Jr., and H. Saltsburg.
25 Apr 67, 22p Rept no. GA-7927
AFOSR-67-1898
Contract AF 49 (638)-2559
See also AD-635 153.

Descriptors: (*Molecular beams, Chemical reactions), (*Exchange reactions, Catalysis), (*Catalysts, Surface properties), Hydrogen, Deuterium, Nickel, Surfaces, Foils, Films.
Identifiers: Surface chemistry.

Progress is reported in a study of the H2-D2 exchange reaction which is catalyzed by a clean nickel surface. The preparation of both polycrystalline Ni target foils and vacuum deposited Ni target films is described. The main reaction parameters studied were the reactant beam flux, the beam temperature, and the surface temperature.
AD-657 364 HC$3.00 MF$0.65

GAS KINETIC EQUATIONS AND THEIR APPLICATIONS TO NONEQUILIBRIUM FLOWS WITH DIFFUSION AND CHEMICAL REACTION,
Ohio State Univ Research Foundation Columbus Dept of Aeronautical and Astronautical Engineering
For primary bibliographic entry see Field 20D.
AD-657 387 Not available from CFSTI.

THE KINETICS OF DISPROPORTIONATION-COMBINATION REACTIONS BETWEEN THE ISOPROPOXYL RADICAL AND NITRIC OXIDE, AND OF THE PYROLYSIS OF THE O-O BOND IN DI-ISOPROPYL PEROXIDE,
Explosives Research and Development Establishment Waltham Abbey (England)
G. A. Hughes, and L. Phillips. 1967, 9p Rept no. ERDE-Offprint-67/11
Availability: Published in Journal of the Chemical Society p894-7 1967.

Descriptors: (*Free radicals, Reaction kinetics), (*Nitrogen oxides, Reaction kinetics), (*Peroxides, Pyrolysis), Disproportionation, Synthesis (Chemistry), Nitrites, Heat of activation, Great Britain.
Identifiers: Isopropyl peroxides.

A study of the early stages of the gas-phase pyrolysis of di-isopropyl peroxide in the presence of excess of nitric oxide at 104.6-149.3C shows that the ratio of the disproportionation reaction, forming acetone and nitroxyl, to combination, forming isopropyl nitrite, is 0.22. The disproportionation reaction has zero activation energy with A2 = K2 approx. = 1.2 x (10 to the 10th power)/mole cu. cm./sec. The initial O-O bond fission in the peroxide is first-order with K1 = 1.4 x 10 to the 15th power exp. (-36,800/RT)/sec.; the close agreement with liquid-phase results is probably due to the low value of the rate constant (6.6 x (10 to the 11th power)/mole cu. cm./sec.) for the recombination of isopropoxyl radicals. (Author)
AD-657 414 Not available from CFSTI.

PARAMAGNETIC RELAXATION.
Johns Hopkins Univ Baltimore Md Carlyle Barton Lab
For primary bibliographic entry see Field 20L.
AD-657 424 Not available from CFSTI.

THE COVALENT BOND IN CRYSTALS. I. ELEMENTS OF A STRUCTURAL THEORY,
Chicago Univ Ill
For primary bibliographic entry see Field 20B.
AD-657 432 HC$3.00 MF$0.65

THE COVALENT BOND IN CRYSTALS. II. PARTIALLY IONIC BINDING,
Chicago Univ Ill
For primary bibliographic entry see Field 20B.
AD-657 433 HC$3.00 MF$0.65

THE COVALENT BOND IN CRYSTALS. III. ANISOTROPY AND QUADRUPOLE MOMENTS,
Chicago Univ Ill
For primary bibliographic entry see Field 20B.
AD-657 434 HC$3.00 MF$0.65

THE COVALENT BOND IN CRYSTALS. IV. LATTICE DEFORMATION ENERGIES,
Chicago Univ Ill
For primary bibliographic entry see Field 20B.
AD-657 435 HC$3.00 MF$0.65

RESEARCH ACTIVITIES IN THE FIELD OF MATERIALS SCIENCE.
North Carolina Univ Chapel Hill Materials Research Center
For primary bibliographic entry see Field 11G.
AD-657 438 HC$3.00 MF$0.65

PYREX MEMBRANE POTENTIAL IN BINARY NITRATE MELTS.
Special rept.,
Miami Univ Coral Gables Fla Dept of Chemistry
A. G. Keenan, Karl Notz, and F. L. Wilcox. Sep 67, 15p Rept no. SR-5
Contract Nonr-4008 (07)

Descriptors: (*Electrolytic cells, Membranes), (*Nitrates, Electrolysis), Electrodes, Heat-resistant glass, Voltage, Ion exchange, Interfaces, Ammonium compounds, Potassium compounds, Sodium compounds, Lithium compounds, Silver compounds, Oxidizers, Propellants.
Identifiers: Fused salts, Ammonium nitrate, Lithium nitrate, Potassium nitrate, Silver nitrate, Sodium nitrate.

Emf measurements are reported at 350C for cells with a Pyrex membrane and containing binary nitrate melts of the type MNO3 - AgNO3. The ion exchange model fits the data whereas the liquid junction model does not. Selectivity constants have the same order in the two systems as well as in aqueous solution. The significance of this is discussed. This work is part of the program to determine the mechanism of decomposition of chloride-catalysed ammonium nitrate melts. Understanding is required of Pyrex membrane potentials in order to develop a reference electrode for in situ acidity measurements in fused salts. (Author)
AD-657 447 HC$3.00 MF$0.65

REDUCTION OF THE CARBON-HYDROGEN BOND STRENGTH IN METHANOL ADSORBED ON PLATINUM FUEL-CELL ELECTRODES,
Naval Ship Research and Development Center Annapolis Md Annapolis Div
For primary bibliographic entry see Field 10B.
AD-657 453 HC$3.00 MF$0.65

BASIC CHEMICAL RESEARCH IN AUSTRALIA,
Queensland Univ Brisbane (Australia) Dept of Chemistry
For primary bibliographic entry see Field 14B.
AD-657 475 Not available from CFSTI.

LOW-FIELD ZEEMAN EFFECT OF THE MICROWAVE SPECTRUM OF THE OH RADICAL.
Technical rept.,
Oklahoma Univ Norman Dept of Physics
Chun C. Lin. 30 Dec 66, 10p Rept no. TR-19
Contract Nonr-982 (07)
Availability: Published in Journal of Molecular Spectroscopy, v23 n2 p201-9 June 1967.

Descriptors: (*Microwave spectroscopy, *Zeeman effect), Gas discharges, Magnetic fields, Electron transitions, Molecular energy levels.
Identifiers: Hydroxyl radicals.

The Zeeman effect of the (2)Pi3/2, J = 9/2, Lambda-doublet transitions of OH (Delta F = 0) was observed in the region of 0-72 gauss. Below 20 gauss the Zeeman splittings depend linearly on the magnetic field strength but the quadratic behavior becomes appreciable at higher fields. The measured splittings agree well with the results of the theoretical calculations. The apparatus used in the experiment is described. (Author)
AD-657 496 Not available from CFSTI.

EXCHANGE INTERACTION BETWEEN NEAREST-NEIGHBOR ION PAIRS. II. V(2+) IN MgO,
California Univ Los Angeles Dept of Physics
For primary bibliographic entry see Field 20L.
AD-657 503 Not available from CFSTI.

NITROGEN LINES IN THE INFRARED FRAUNHOFER SPECTRUM,
Liege Univ Cointe-Sclessin (Belgium) Institut D'Astrophysique
For primary bibliographic entry see Field 3B.
AD-657 507 Not available from CFSTI.

INITIAL WARMUP OF 500,000-GALLON LIQUID HYDROGEN DEWAR,
Los Alamos Scientific Lab., N. Mex.
D. H. Liebenberg, and E. Murley. 22 Mar 67, 9p
Contract W-7405-eng-36

Descriptors: (*Liquefied gases, *Hydrogen), (*Water vapor, Contamination), Heaters, Nuclear physics laboratories.

For abstract, see NSA 21 16.
LA-3661 HC$3.00 MF$0.65

ANNUAL PROGRESS REPORT FOR THE PERIOD JULY 1965 THROUGH JUNE 1966.
New Brunswick Lab. (AEC), N. J.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 16.
NBL-237 HC$3.00 MF$0.65

IN-PILE CORROSION OF NUCLEAR MATERIALS QUARTERLY REPORT, JUN. 1 - AUG. 31 1966.
Centre D Etude de L Energie Nucleaire, Mol (Belgium).
For primary bibliographic entry see Field 11F.
For abstract, see STAR 05 19.
N67-33014 HC$3.00 MF$0.65

COMPARISON OF SOME METHODS FOR ANALYZING THE OPTICAL PROPERTIES OF MOLECULAR AGGREGATES.
Comparaison de Quelques Methodes D'analyse des Proprietes Optiques des Agregats Moleculaires
Commissariat A L Energie Atomique, Saclay (France). Centre D'etudes Nucleaires.
J. Thiery. Dec 65, 15p CEA-R-2878
in French, English Summary

Descriptors: *Excitation, *Molecular theory, *Optical property, *Polarizability, Analysis, Change, Dimer, Interpretation, Molecular, Optical, Property, Spectrum, Theory.

For abstract, see STAR 05 19.
N67-33031 HC$3.00 MF$0.65

CALCULATION OF THE FRACTIONAL RELEASE OF GASES FROM A SPHERE AFTER RECOIL BOMBARDMENTS.
European Atomic Energy Community, Ispra (Italy). Chemistry Dept.
G. Di Cola, and HJ. Matzke. Jun 67, 15p EUR-3488.E

Descriptors: *Annealing, *Bombardment, *Gas phase, *Sphere, Calculation, Diffusion, Fraction, Gas, Inert, Material, Phase, Radiochemistry, Recoil, Release.

For abstract, see STAR 05 19.
N67-33081 HC$3.00 MF$0.65

CORROSION IN THE PRESENCE OF A COMPLEXING AGENT APPLICATION TO THE CONTINUOUS DETERMINATION OF HYDROFLUORIC ACID IN THE ATMOSPHERE.
Commissariat A L Energie Atomique, Fontenay-Aux-roses (France). Centre D'etudes Nucleaires.
For primary bibliographic entry see Field 11F.
For abstract, see STAR 05 19.
N67-33160 HC$3.00 MF$0.65

STUDY OF THE DISPERSION PHENOMENA CONNECTED WITH THE ABSORPTION BY RECOILLESS NUCLEAR RESONANCE FLUORESCENCE.
Etude des Phenomenes de Dispersion Lies A l'Absorption Resonnante Sans Recul des Noyaux Atomiques
Commissariat A L Energie Atomique, Saclay (France). Centre D'etudes Nucleaires.
P. Imbert. 1966, 72p CEA-R-2925
in French, English Summary

Descriptors: *Dispersion, *Faraday rotation, *Fluorescence, *Nuclear spectroscopy, *Resonance effect, Absorption, Beam, Birefringence, Curve, Effect, Line, Magnetic, Mossbauer effect, Nuclear, Resonance, Rotation, Spectroscopy, Splitting.

For abstract, see STAR 05 19.
N67-33162 HC$3.00 MF$0.65

LOW TEMPERATURE SPECIFIC HEAT OF CARBIDES V2C, NB2 C, MO2 C, AND V MO C.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 20L.
For abstract, see STAR 05 19.
N67-33425 HC$3.00 MF$0.65

ELECTRONIC SPECIFIC HEATS AT LOW TEMPERATURE OF TANTALUM HYDROGEN COMPOUNDS.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 20L.
For abstract, see STAR 05 19.
N67-33426 HC$3.00 MF$0.65

ON THE INTERACTIONS BETWEEN CARBON MONOXIDE AND TRANSITION METALS.
Contribution A l'Etude des Interactions de l'Oxyde de Carbone Et des Metaux de Transition
Commissariat A L Energie Atomique, Saclay (France). Centre D'etudes Nucleaires.
D. A. Degras. 23 Dec 66, 140p CEA-R-3123
in French, English Summary

Descriptors: *Carbon monoxide, *Metal surface, *Surface interaction, Adsorption, Atom, Bibliography, Carbon, Cohesion, Density, Dependence, Desorption, Energy, Entropy, France, Gas, Interaction, Local, Metal, Monoxide, Population, Pressure, Solid, Surface, Temperature, Transition.

For abstract, see STAR 05 19.
N67-33495 HC$3.00 MF$0.65

PERCENTAGE DETERMINATION OF OXYGEN, NITROGEN, CARBON AND SILICIUM IN REFRACTORY METALS AND THEIR ALLOYS BY EMISSION SPECTROMETRY IN THE FAR U.V. SPECTRUM.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 11F.
For abstract, see STAR 05 19.
N67-33501 HC$3.00 MF$0.65

ELECTRONIC STRUCTURE OF TRANSITION CARBIDES AND NITRIDES.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
P. Costa. 1967, 15p ONERA-TP-481/1967/
Presented At the Intern. Symp. on Anisotropy of Monocrystal Refractory Compds., Dayton, Ohio, 13-15 Jun. 1967

Descriptors: *Carbide, *Electronic structure, *Nitride, *Transition element, Band, Compound, Electronic, Element, Heat, Interstitial, Magnetic, Metal, Model, Nuclear, Resonance, Specific, Structure, Transition.

For abstract, see STAR 05 19.
N67-33967 HC$3.00 MF$0.65

7E. Radio and Radiation Chemistry

REVERSIBLE PHOTOISOMERIZATION OF 1,2-BIS (9-ANTHRYL)-ETHANE,
Minnesota Univ Minneapolis Div of Physical Chemistry
Robert Livingston, and Kei Sin Wei. 21 Jan 67, 6p
AROD-2397:13
Grant DA-ARO (D)-31-124-G738
Availability: Published in Journal of the American Chemical Society v89 n13 p3098-3100 Jun 21 1967.

Descriptors: (*Polycyclic compounds, Photochemistry), (*Stereochemistry, Polycyclic compounds), Molecular isomerism, Absorption spectrum, Chemical equilibrium, Fluorescence, Molecular energy levels, Continuous spectrum, Anthracenes.
Identifiers: Bis (anthryl)ethanes, Quantum yield.

The hydrocarbon 1,2-bis (9-anthryl)ethane (I) is photoisomerized efficiently and reversibly. The isomeric product (II) does not absorb appreciably at wavelengths longer than 260 millimicrons. The quantum yields of the forward and back reactions (0.19 and 0.42, respectively) are independent of the concentration of the reactant. Compound I is strongly fluorescent with maxima at 408, 436, and 460 millimicrons, and a fluorescent quantum yield of about 0.37. Flash illumination of its deoxygenated solutions produces an absorption transient, similar to but not identical with the lowest triplet of anthracene. No attempt was made to observe the fluorescence or triplet formation of the isomer (II). (Author)
AD-656 805 Not available from CFSTI.

CORRELATION BETWEEN THE PHOTOCHEMISTRY AND THE MASS SPECTRA OF PYRUVIC ACID AND ISOPROPYL PYRUVATE,
Columbia Univ New York Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-656 982 Not available from CFSTI.

AFTERGLOW STUDIES IN NITROGEN,
Minnesota Univ Minneapolis Dept of Electrical Engineering
For primary bibliographic entry see Field 20I.
AD-657 355 HC$3.00 MF$0.65

THE BETA RADIOLYSIS OF DICHLORODIFLUOROMETHANE.
Atomic Weapons Research Establishment, Aldermaston (England).
P. J. Denny, R. Gibson, and P. M. Jones. Dec 66, 23p AWRE-O-99/66

Descriptors: *Gas phase, *Methane, *Radiolysis, *Tritium, Compound, Dichloride, Difluoro, Grease, Halogenation, Ion, Molecule, Reaction, Vacuum.

For abstract, see STAR 05 19.
N67-33554 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIEIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

NUCLEAR CHEMISTRY DIVISION ANNUAL REPORT, 1966,
California Univ., Berkeley. Lawrence Radiation Lab.
B. B. Cunningham, and F. L. Reynolds. Jan 67, 419p
Contract W-7405-eng-48

Descriptors: (*Nuclear spectroscopy, *Nuclear reactions), (*Nuclear scattering, *Nuclear structure), (*Fission, *Hyperfine structure), Instrumentation, Mass spectroscopy, Separation, Purification, Crystal structure, Radiochemistry, Radiation chemistry.

For abstract, see NSA 21 16.
UCRL-17299 HC$3.00 MF$0.65

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

COLLECTED REPORTS OF THE 1966 STUDENT TRAINEES OF THE RESEARCH AND DEVELOPMENT DEPARTMENT.
Informal rept.
Naval Oceanographic Office Washington D C
Jun 67, 191p Rept no. NOO-1R-67-45

Descriptors: (*Oceanology, Reviews), Ocean currents, Fouling, Marine biology, Sea water, Marine meteorology, Photography, Ocean waves, Navigation, Wind, Magnetic fields.

Contents: Empirical current and wind drift studies; Worldwide marine fouling; Magnetic survey of the east coast; Arctic plankton studies; On the concentration and identification of trace elements in sea water; Practical considerations involved in design of buoyed instrument arrays; Program distribu: computation of half-period, period, amplitude, and wave-height distributions using the CDC 3800 computer; Sargassum air bladders as sound scatterers; A method for point to point graphical rectification of high altitude high oblique photography; Argus Island flux meter and wind data; Optical environmental conditions of shallow water applied to study limits of proposed laser fathometer; A study of two wave forecasting methods; Program wave: generation of a discrete time series with predetermined spectral components; Development of a polarographic sensor for dissolved oxygen; Volume reverberation due to the deep scattering layer; SOFAR navigation systems (SONS) tests.
AD-656 915 HC$3.00 MF$0.65

STUDIES IN MARINE GEOPHYSICS AND UNDERWATER SOUND FROM A DRIFTING ICE STATION.
Columbia Univ New York
For primary bibliographic entry see Field 8G.
AD-656 922 HC$3.00 MF$0.65

SEASONAL MEASUREMENT OF OCEANOGRAPHIC PARAMETERS IN THE KAULAKAHI CHANNEL, HAWAII,
Hawaii Inst of Geophysics Honolulu
For primary bibliographic entry see Field 8C.
AD-657 119 HC$3.00 MF$0.65

PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUBIA RIVER EFFLUENT AREA, 1965. VOLUME II.
Rept. for Jan-Nov 1965,
Washington Univ Seattle Dept of Oceanography
J. R. Beck. Feb 67, 327p Rept no. TR-182-Vol-2, WU-Ref-M67-10
Contracts AT (45-1)-1725, Nonr-477 (37)
See also AD-654 172, Vol. I.

Descriptors: (*Oceanographic data, Pacific Ocean), (*Oceanology, Reports), Periodic variations, Rivers, Ocean bottom sampling, Physical properties, Temperature, Salinity, Plankton, Oxygen, Carbonates, Nitrates, Data processing systems, Oceanographic equipment, Sea water, Quantative analysis, Climatology, Washington (State).

Volume II of this two-volume report contains tabulated physical and chemical data collected during cruises 353, 354, 355, 356, 365, 367, and 371 of the Research Vessel Brown Bear during 1965 in an area within 100 nautical miles of the coasts of Washington and Oregon. These data were collected as part of a year-round study which has as its objectives the determination of the properties, distribution, and movement of the Columbia River effluent water in the Northeast Pacific. (Author)
AD-657 130 HC$3.00 MF$0.65

REPRODUCTION AND DEVELOPMENT OF P. JAPONICUS OFF THE COAST OF SOUTHERN SAKHALIN,
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 6C.
AD-657 291 HC$3.00 MF$0.65

SOME DATA ON THE ZOOPLANKTON OF THE WEST COAST OF SOUTH SAKHALIN,
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 6C.
AD-657 292 HC$3.00 MF$0.65

INVESTIGATIONS OF ICHTHYOPLANKTON CARRIED OUT BY THE KURILE-SAKHALIN EXPEDITION,
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 6C.
AD-657 293 HC$3.00 MF$0.65

THE QUALITATIVE AND QUANTITATIVE COMPOSITION OF PHYTOPLANKTON AND

ITS DISTRIBUTION IN THE WATERS OF SOUTH SAKHALIN AND THE SOUTHERN KURILE ISLANDS,
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 6C.
AD-657 294 HC$3.00 MF$0.65

DATA ON THE REPRODUCTION AND DEVELOPMENT OF SOME FISH SPECIES INHABITING THE SOUTHERN SAKHALIN AND SOUTHERN KURILE REGIONS,
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 6C.
AD-657 304 HC$3.00 MF$0.65

THE OCEAN SCIENCE PROGRAM OF THE U. S. NAVY: ACCOMPLISHMENTS AND PROSPECTS.
Office of the Oceanographer of the Navy Alexandria Va
Jun 67, 110p

Descriptors: (*Oceanology, Naval research), Management engineering, Underwater sound, History, Marine geology, Marine geophysics, Marine biology, Instrumentation, Minerals, Weather, Sedimentation, Ocean bottom topography, Recreation, Aquatic animals, Oceanographic data, Exploration, Oceanographic vessels, Arctic regions.

Contents: Introduction; (objectives of the ocean-science program, Organization and management, the history of ocean science in the Navy), The Navy ocean science program; (physical oceanography, chemical oceanography, marine geology and geophysics, oceanic biology, underwater sound, environmental prediction, engineering research, instrumentation, special-purpose platforms, ocean data stations), Major accomplishments; (oceanic circulation, thermal structure, wave forecasting, physiography, sediment and crustal structure, gravity and geodesy, arctic, geophysical instruments and systems, oceanographic buoys, deep underwater vehicles, man-in-the-sea program), Support of other national objectives; (marine food resources, transportation, mineral and energy resources, weather prediction, public health and recreation, engineering, international understanding and cooperation, education), Prospects for the future; (ocean dynamics, air-sea interaction, chemistry of the ocean, benthic boundary studies, sea floor topography and sediment studies, crustal and subcrustal studies, oceanic biology, underwater sound, scientific platforms and instrumentation, major cooperative experiments, ocean exploration and exploitation). (Author)
AD-657 389 HC$3.00 MF$0.65

HYDROCARBONS IN DIGESTIVE TRACK AND LIVER OF A BASKING SHARK.
Technical rept.,
Woods Hole Oceanographic Institution Mass
Max Blumer. Aug 67, 6p Rept no. WHOI-Ref-67-44, WHOI-Contrib-1894
Contract N00014-66-C-0241, Grant NSF-GA-539
Availability: Published in Science v156 n3773 p390-1 1966.

Descriptors: (*Hydrocarbons, Plankton), (*Sharks, *Digestive system), Fatty acids, Lipids, Gas chromatography, Distillation, Food.

The hydrocarbons of zooplankton pass through the digestive tract of the basking shark without fractionation or structural modification. They are resorbed in the spiral valve and deposited in the liver. In contrast to unsaturated fatty acids, the olefinic hydrocarbons are not decreased in concentration. The hydrocarbon assemblage in the digestive tract and in the liver is indicative of the food sources and feeding grounds of the shark. Squalene, abundant in shark liver, occurs only in traces in zooplankton; phytane, if present at all, constitutes less than 0.005 percent of the hydrocarbons of zooplankton and of shark liver. (Author)
AD-657 412 Not available from CFSTI.

HOLOTHURIANS OF THE GENERA ELPIDIA AND KOLGA FROM THE CANADIAN BASIN OF THE ARCTIC OCEAN,
University of Southern California Los Angeles Allan Hancock Foundation
For primary bibliographic entry see Field 6C.
AD-657 506 Not available from CFSTI.

8B. Cartography

GEOMETRICAL CONSIDERATIONS FOR MAPPING FROM SCAN IMAGERY,
New Brunswick Univ Fredericton
G. Konecny, and E. E. Derenyi. 1966, 12p
Availability: Presented at the Annual Meeting of the American Society of Photogrammetry, Washington, D. C., p327-38 1966.

Descriptors: (*Mapping, Projective geometry), Scanning, Photogrammetry, Radar, Stereoscopic photography, Geometry.

Perspective and projective geometry are the mathematical tools which enable mapping from photographic images taken by a frame camera. The use of frame photography is restricted to narrow specifications with regard to light and atmospheric conditions and other factors. Scan photography and the geometrically related scan imagery (infrared, etc.) are much less restrictive, but introduce a variety of geometrical problems which make their use for mapping a difficult task. While the evaluation of frame photography for geometrical measurement has developed into the science of photogrammetry, an equivalent development has yet to take place for the evaluation of line-scan imagery. Ways of achieving a complete geometrical evaluation are outlined. Formulations for frame photography, strip photography, panoramic scan photography and line scan imagery are compared. An example for the theoretical fidelity of line scan imagery is presented; other passive and active imagery systems are discussed. (Author)
AD-656 814 Not available from CFSTI.

GEOPHYSICAL STUDY OF BASIN-RANGE STRUCTURE DIXIE-VALLEY REGION, NEVADA.
Stanford Univ Calif Dept of Geophysics
For primary bibliographic entry see Field 8G.
AD-657 326 HC$3.00 MF$0.65

PHOTOGRAMMETRIC MAPPING USING VERTICALITY DATA.
Final rept. 23 Mar-23 May 62,
Ohio State Univ Research Foundation Columbus
Arthur J. Brandenberger. 23 May 62, 69p
Contract AF 08 (614)-3188

Descriptors: (*Photogrammetry, *Mapping), Analysis, Maps, Aerial photography, Photographic techniques.

An analysis is made of current photomapping (photogrammetric) equipment and techniques and their adaptability to utilize vertical data (vertical photography obtained by using a stabilized camera mount, or recorded deviations of the camera axis from the vertical). The availability of such data permits modification of map compilation techniques and recommendation of more simple, efficient, or accurate procedures. The analysis considers various cases such as vertical photography stabilized to within 30 in., near vertical photography with roll and pitch recorded to within 30 in., and vertical photography stabilized to within 3 feet. This study shows that an essential gain in efficiency of photogrammetric mapping is to be expected if such verticality data are available. (Author)
AD-657 368 HC$3.00 MF$0.65

VERTICAL EXAGGERATION IN THREE-DIMENSIONAL MAPPING.
Technical rept.,
Kansas Univ Lawrence Dept of Geography
George F. Jenks, and Fred C. Caspall. Jul 67, 37p Rept no. TR-2
Contract Nonr-583 (15)

Descriptors: (*Mapping, Design), Terrain, Maps, Topology, Performance (Human), Effectiveness, Map reading.

The experiments reported upon indicate that 3-D maps can and should be made with vertical exaggeration. The approximate amount of vertical exaggeration needed to create 'realistic' maps has been found to correlate with the contour interval of the base map. It has also been shown that skilled map-readers can consistently evaluate 3-D maps. The report contains all of the data collected in the experiments and includes a large number of illustrations of 3-D maps. The vertical exaggerations to be used in different mapping situations are presented in graphic form. (Author)
AD-657 441 HC$3.00 MF$0.65

8C. Dynamic Oceanography

ANALYSIS OF TIDAL CURRENT OBSERVATIONS OVER THE NORTHEASTERN SHELF OF THE GULF OF MEXICO,
Texas A and M Univ College Station Dept of Oceanography
Donald L. Durham, and Robert O. Reid. Apr 67, 118p Rept no. A/M-Ref-67-1T
Contract Nonr-2119 (04)

Descriptors: (*Mexico Gulf, *Tides), Mathematical analysis, Ocean currents, Oceanographic data, Theses, Florida, Oceanographic equipment, Temperature, Diurnal variations.

A taut-wire subsurface buoy system was designed and used in 300 feet of water over the northeastern shelf of the Gulf of Mexico offshore from Panama City, Florida for obtaining nearly continuous in situ current measurements at two water depths during the period of 0600 C.S.T. on 13 June 1965 to 1200 C.S.T. on 26 June 1965. Spectral and harmonic analysis were performed on these measurements to determine the dominant tidal components present in the northward and eastward components of these current measurements. Small diurnal tidal currents rotating contra solem were found to exist with little or no indication of semi-diurnal tidal currents present in the data. The eastward and northward components of the diurnal tidal currents were found to have amplitudes of 5.15 cm/sec. and 2.28 cm/sec., respectively. In comparison, the RMS for the total current at the same location had an eastward component of 10.3 cm/sec. and a northward component of 5.4 cm/sec. A study of the thermal structure of the area around the location of the buoy system was conducted using four vessels and a stationary platform. Little indication of internal tides was found by a preliminary study of the thermal data.
AD-656 910 HC$3.00 MF$0.65

A SEQUENCE OF CURRENT PATTERNS IN THE GULF OF MEXICO,
Texas A and M Univ College Station Dept of Oceanography
Dale F. Leipper. Jun 67, 49p Rept no. A/M-Ref-67-9
Contract Nonr-2119 (04)

Descriptors: (*Mexico Gulf, *Ocean currents), Florida Strait, Oceanographic data, Gulf Stream, Temperature, Flow fields, Cuba, Mexico.

The primary current in the Gulf of Mexico is in the form of a loop entering through the Yucatan Channel and eventually leaving through the Florida Straits. It transports some 25 to 45 million m3/sec of water at 1 to 4 knots. It is known to be variable in position but little information concerning the exact nature of the variations is published. A series of eight cruises of about two weeks duration each was conducted by the author over a 30-month period in the different seasons. The primary current was crossed 40 times. Five of these cruises supplemented by three others having somewhat differing objectives provided a series of eight cruises in one 16-month period beginning in July 1965. A reasonable sequence of current patterns for the primary current loop is indicated by the observations. The sequence results are compared to data available from other time periods. The flow is well represented year-around by the topographies of the 22 degrees C isothermal surfaces.
AD-656 911 HC$3.00 MF$0.65

COLLECTED REPORTS OF THE 1966 STUDENT TRAINEES OF THE RESEARCH AND DEVELOPMENT DEPARTMENT.
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 8A.
AD-656 915 HC$3.00 MF$0.65

STUDIES IN MARINE GEOPHYSICS AND UNDERWATER SOUND FROM A DRIFTING ICE STATION.
Columbia Univ New York
For primary bibliographic entry see Field 8G.
AD-656 922 HC$3.00 MF$0.65

A STUDY OF THE MECHANISM OF SEA SURFACE SCATTERING.
Polytechnic Inst of Brooklyn N Y Dept of Electrophysics
For primary bibliographic entry see Field 20N.
AD-657 093 Not available from CFSTI.

COLLECTED REPRINTS, 1958-1961: VOLUME V,
Johns Hopkins Univ Baltimore Md Chesapeake Bay Inst
D. W. Pritchard, J. Williams, J. H. Carpenter, M. J. Pollak, and B. Kinsman. Feb 63, 145p
See also AD-657 103.
Availability: Published in Various Journals.

Descriptors: (*Chesapeake Bay, *Estuaries), (*Radioactive waste, Disposal), Hydrology, Tracer studies, Oceans, Salinity, Wind, Ocean waves, Instrumentation, Oceanology, Rivers, Tides.

Contents: The equations of mass continuity and salt continuity in estuaries; Salt balance and exchange rate for Chincoteague Bay; The movement and mixing of contaminants in tidal estuaries; The application of existing oceanographic knowledge to the problem of radioactive waste disposal into the sea; A small portable unit for making in situ salinity and temperature measurements; Tracer for circulation and mixing in natural waters; Disposal of radioactive wastes in the ocean; The Chesapeake Bay Institute study of the Baltimore Harbor; Wind set-up and shear-stress coefficient in Chesapeake Bay; Measurements of turbulent diffusion in estuarine and inshore waters; Problems in oceanographic instrumentation; Some evidence on the effect of nonlinearity on the position of the equilibrium range in wind-wave spectra; Estuarine oceanography; River tides; Tidal bore.
AD-657 102 Not available from CFSTI.

COLLECTED REPRINTS: VOLUME 6,
Johns Hopkins Univ Baltimore Md Chesapeake Bay Inst
Donald W. Pritchard, R. B. Montgomery, E. D. Stroup, W. R. Taylor, and Akira Okubo. Apr 65, 204p
Contract AT (30-1)-1477, Grant NSF-G-12342
Research supported in part by Office of Naval Research. See also AD-657 102. Prepared in cooperation with Maryland Univ. College Park, Natural Resources Inst.
Availability: Published in Various Journals.

Descriptors: (*Radioactive waste, Disposal), Environment, Pacific Ocean, Salinity, Estuaries, Ocean currents, Photosynthesis, Marine biology, Bathythermograph data, Diffusion.

Contents: Disposal of radioactive wastes: its history, status and possible impact on the environment; Equatorial waters and currents at 150 deg. W in July-August 1952; Bioluminescence of marine dinoflagellates I: An underwater photometer for day and night measurements; Radioactive wastes in the marine environment; Equatorial Undercurrent observations in review; A review of theoretical models for turbulent diffusion in the sea; Comments on the history of the equatorial undercurrent; Chesapeake Bay Institute and the Department of Oceanography, The Johns Hopkins University; The Sea: Ideas and Observations on Progress in the Study of the Seas, 2 306-324; Inorganic nutrient requirements for marine phytoplankton organisms; The relationship between light and photosynthesis in intertidal benthic diatoms; Meridional distribution of temperature-salinity characteristics of Pacific Ocean surface water; Measurements of equatorial currents in the Gilbert Islands area, July-August 1963; Two theorems relating scalar fields; Equations describing the diffusion of an introduced pollutant in a one-dimensional estuary; Flux and water characteristics of the Pacific North Equatorial Current; Light and photosynthesis in intertidal benthic diatoms; Thermocline structure in the equatorial Pacific; Determination of chlorinity using a differential potentiometric end point; Interpretations and conclusions.
AD-657 103 Not available from CFSTI.

SEASONAL MEASUREMENT OF OCEANOGRAPHIC PARAMETERS IN THE KAULAKAHI CHANNEL, HAWAII,
Hawaii Inst of Geophysics Honolulu
John C. Belshe. May 67, 90p Rept no. Applied Oceanography Ser-3, HIG-67-5
Contract N123 (61756)56870A

Descriptors: (*Oceanology, Hawaii), Ocean currents, Periodic variations, Measurement, Tides, Climatology, Ocean waves, Underwater sound, Velocity, Salinity, Temperature, Bathythermograph data, Tables, Marine biology, Geophysics, Meteorology.

Contents: Meteorology; (Shipboard measurements, Barstur climatology), Hydrological measurements; (Surface currents, wave and swell, tides, Tsunamis), Hydrological measurements; (Sound velocity, temperature, mixed layer, salinity, deep currents), Sea-floor data; Marine biology, Geophysical data. (Author)
AD-657 119 HC$3.00 MF$0.65

CURRENT MEASUREMENTS IN THE CANADIAN BASIN OF THE ARCTIC OCEAN, SUMMER, 1965,
Washington Univ Seattle Dept of Oceanography
J. A. Galt. Mar 67, 24p Rept no. TR-184, WU-Ref-M67-15
Contract Nonr-477 (37)
Prepared in cooperation with Arctic of North America. See also AD-654 172.

Descriptors: (*Oceanology, Reports), (*Ocean currents, Arctic Ocean), Measurement, Ice islands, Oscillation, Temperature, Salinity, Velocity.

Current measurements were made from Ice Island T-3 during the summer of 1965. Two current regimes were identified. One was in the pycnocline where a strong current core developed occasionally. The second was in the nearly isopycnal water below 400 meters, where the currents were slow and no significant shear was found. Inertial oscillation was detected in the island's drift. (Author)
AD-657 120 HC$3.00 MF$0.65

THE OCEAN SCIENCE PROGRAM OF THE U. S. NAVY: ACCOMPLISHMENTS AND PROSPECTS.
Office of the Oceanographer of the Navy Alexandria Va
For primary bibliographic entry see Field 8A.
AD-657 389 HC$3.00 MF$0.65

ASYMMETRY OF INTERNAL TIDAL WAVES IN SHALLOW COASTAL WATERS,
Navy Electronics Lab San Diego Calif
J. L. Cairns. 9 Feb 67, 3p
Availability: Published in Journal of Geophysical Research v72 n14 p3563-5 Jul 15 1967.

Descriptors: (*Tides, Thermal properties), Asymmetric bodies, Oceans, Water waves, Thermistors, Tables, Measurement.

An investigation of thermal structure fluctuations of tidal frequencies showed that an internal tidal wave profile becomes asymmetric as the wave enters shoaling coastal waters. The asymmetry is more pronounced with increased wave height, and it results in higher-amplitude waves, assuming the characteristics of internal tidal bores. (Author)
AD-657 501 Not available from CFSTI.

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

8D. Geochemistry

THE OCEAN SCIENCE PROGRAM OF THE U. S. NAVY: ACCOMPLISHMENTS AND PROSPECTS.
Office of the Oceanographer of the Navy Alexandria Va
For primary bibliographic entry see Field 8A.
AD-657 389 HC$3.00 MF$0.65

PARTICULATE ORGANIC CARBON IN THE DEEP SEA.
Technical rept.,
Woods Hole Oceanographic Institution Mass
David W. Menzel. 19 Oct 66, 13p Rept no. WHOI-Ref-67-43, WHOI-Contrib-1842
Contracts N00016-66-C-0241, AT (30-1)-1918
Availability: Published in Deep-Sea Research v14 p229-38 1967.

Descriptors: (*Organic compounds, Pacific Ocean), (*Carbon, Atlantic Ocean), Particles, Deep water, Ocean bottom sampling, Plankton, Theory, Samplers.

Data showing the distribution of particulate and dissolved organic carbon in the tropical Pacific and Atlantic Oceans are given and support the following conclusions: surface standing crop has no measurable influence on the concentration of organic particles occurring at depth; below a given distance of the surface, the distribution of these particles is homogeneous in time, space, and depth; there is no consistent decrease in dissolved organic carbon with depth. Alternate theories to explain the observed pattern of particle distribution in the deep-sea are discussed. (Author)
AD-657 411 Not available from CFSTI.

TRITIUM AND OTHER ENVIRONMENTAL ISOTOPES IN THE HYDROLOGICAL CYCLE.
International Atomic Energy Agency, Vienna (Austria).
1967, 92p
Its Tech. Repts. Ser. No. 73

Descriptors: *Hydrology, *Radioactive isotope, *Tritium, Concentration, Cycle, Distribution, Environment, Hydrosphere, Isotope, Precipitation, Radioactivity, Resource, Table, Water.

For abstract, see STAR 05 19.
N67-33469 HC$3.00 MF$0.65

THE CRUST AND THE UPPER MANTLE OF THE CONTINENTS.
Academy of Sciences (USSR), Moscow. Soviet Geophysical Committee.
For primary bibliographic entry see Field 8G.
For abstract, see STAR 05 19.
N67-33683 HC$3.00 MF$0.65

8E. Geodesy

GEOPHYSICAL CONSTANT DETERMINATION FROM SATELLITE OBSERVATIONS: DIGITAL COMPUTER PROGRAM.
Final rept. (Vol 1), May 66-Jun 67,
Martin Co Baltimore Md
Karlis Minka, Bruce E. Clemenz, and Jacques Fein. Jun 67, 136p Rept no. ER-14617-Vol-1
AFCRL-67-0426-Vol-1
Contract AF 19 (628)-4167

Descriptors: (*Computer programs, Orbital trajectories), (*Geophysics, Satellites (Artificial)), Digital computers, Gravity, Errors, Harmonic analysis, Atmospheric motion, Flow charting.
Identifiers: FORTRAN IV, MAP.

The computer program is based on a development of the Minimum Variance Method contained in Report AFCRL-65-579 (Martin Marietta Report ER 13950, Ref. 1). The partial derivatives of the rectangular coordinates with respect to the classical elements, which are not covered in Ref. 1, are given in the appendix. A general description of the program including discussion of the inputs, operating modes, initial value estimation and a test sample is presented. Also included are the program inputs and outputs, lists of symbols, flow charts and other essentials necessary to operate the program and to facilitate any subsequent modifications. The program is written in FORTRAN IV and machine language (MAP). The major part of the program is in double precision. (Author)
AD-657 361 HC$3.00 MF$0.65

CALIBRATION OF GRAVIMETERS WITH HORIZONTAL TORSION FILAMENT BY TILT METHOD.
Academy of Sciences (USSR), Moscow. Soviet Geophysical Committee.
V. A. Romaniuk, and R. B. Rukavishnikov. 1966, 127p
in Russian, English Summary

Descriptors: *Calibration, *Filament, *International geophysical year (igy), *Torsion, Equation, Error function, Geophysics, Gravimeter, International, Plate, Tilt, U.S.S.R., Year.

For abstract, see STAR 05 19.
N67-33755 HC$3.00 MF$0.65

8F. Geography

COMPARATIVE WAVEFORM ANALYSIS OF MULTISENSOR IMAGERY.
Technical rept.,
Florida Atlantic Univ Boca Raton Dept of Geography
James P. Latham, and Richard E. Witmer. Jul 67, 11p Rept no. TR-3
Contract Nonr-4761 (00)
Prepared for presentation at the Annual Convention of the American Society of Photogrammetry, Washington, D. C., March 1967.
Availability: Published in Photogrammetric Engineering p779-86 Jul 1967.

Descriptors: (*Geography, *Photointerpretation), Pattern recognition, Television receivers, Images, Electronic scanners, Infrared scanning, Signals, Photogeology, Oceans, Thermal properties, Photogrammetry, Terrain, Aerial photography.

Video conversion of imagery to sampling scan lines which generate waveforms measuring gray tones (or thermal variation) in the distribution pattern demonstrates a basis for instrumented comparative analyses. Distribution patterns are sampled by parallel scan lines for analogue waveform interpretation. Orientation controls and gray tone differentiation are referred to the relation between signal rise time and boundary determinations as illustrated by land and water surface thermal contrasts. Illustrations drawn principally from the central image area gain greater resolution and biaxial fidelity. Graphical and statistical comparative analyses of waveforms generated by infrared imagery demonstrates both information content and trade-offs associated with level of generalization resulting from variations in either resolution of imagery or resolution of scanning systems. The possibility of directly analyzing an image from the signals which transmit it is noted. Experimental results demonstrate the value of waveform analysis for revealing geographic patterns. (Author)
AD-657 529 Not available from CFSTI.

8G. Geology and Mineralogy

STUDIES IN MARINE GEOPHYSICS AND UNDERWATER SOUND FROM A DRIFTING ICE STATION.
Semi-annual technical summary rept. 1 Jan-30 Jun 67,
Columbia Univ New York
Kenneth Hunkins. 1967, 23p
Contract Nonr-266 (82), ARPA Order-218-61

Descriptors: (*Marine geophysics, Arctic regions), (*Underwater sound, Sound transmission), Position finding, Navigation satellites, Ice islands, Oceanology, Marine geology, Geochemistry, Marine biology.

Contents: Research at Fletcher's ice island (T-3); Theoretical studies of long-range sound transmission.
AD-656 922 HC$3.00 MF$0.65

SOME TOWED LINE HYDROPHONE ARRAYS FOR SEISMIC REFLECTION PROFILING.
Lamont Geological Observatory Palisades N Y
For primary bibliographic entry see Field 9A.
AD-656 936 HC$3.00 MF$0.65

MEAN FREE AIR ANOMALIES: SOURCES OF INFORMATION ON HETEROGENEITIES IN THE EARTH'S MANTLE.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
M. E. Artemev. Jul 67, 21p
ACIC-TC-1216, TT-67-62163
Osrednennye Anomalii Faya-istochnik Informatsii o Neodnorodnostyakh v Mantii, trans. of Moskovskoe Obshchestvo Ispytatelei Prirody. Byulleten Otdel Geologicheskii (USSR) v40 n5 p93-105 1965.

Descriptors: (*Structural geology, Gravity), Anomalies, Maps, Folds (Geology), Density, Faults (Geology), USSR.

Maps of mean free air anomalies of the entire earth by data of I. D. Zhongolovich, W. A. Heiskanen and W. M. Kaula are presented. These anomalies which are a substitute for the isostatic anomalies are evidently connected with the heterogeneities in the mantle, which encompass vast territories. Noted is the confinement of the strongest anomalies to regions of increased tectonic activity. The translation discusses the gravitational field of the earth in regard to density heterogeneities, free air anomalies and mean air anomalies. There is a comparison of maps of free air anomalies for the entire earth, constructed by different authors and by various methods. Certain conclusions were reached on the basis of different factual data. These conclusions are also presented. (Author)
AD-656 992 HC$3.00 MF$0.65

CORRELATION OF SEISMIC AND GRAVIMETRIC DATA ON THE STRUCTURE OF THE EARTH'S CRUST IN THE BLACK SEA DEPRESSION.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
Ya. P. Malovitskii, and Yu. P. Neprochnov. Aug 67, 21p
ACIC-TC-1222, TT-67-62621
Sopostavlenie Seismicheskikh i Gravimetricheskikh Dannykh o Stroenii Zemnoi kory Chernomorskoi Vpadiny, trans. of mono. Stroenie Chernomorskoi Vpadiny. Sbornik Statei, Moscow, 1966 p1-16.

Descriptors: (*Geophysical prospecting, Black Sea), Geology, Seismic waves, Gravity, Anomalies, Mathematical analysis, USSR.

Many geophysical investigations were made in the Black Sea depression. Their data shed new light on the abyssal structure and history of the geological development of this region. It has now become necessary to generalize and make a complex interpretation of the data obtained by different geophysical methods for the Black Sea with full use of the extensive geological-geophysical materials on the surrounding land sections. In this work, an attempt is made to explain the character of the connection between the gravitational anomalies in the Bouguer reduction and the abyssal structure of the earth's crust of the Black Sea depression on the basis of a comparison between the abyssal seismic sounding data and gravimetry. (Author)
AD-656 994 HC$3.00 MF$0.65

INTERPRETATION OF THE MAGNETIC AND GRAVITATIONAL ANOMALIES ABOVE STRATFIED BODIES.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
A. A. Yunkov. Jul 67, 86p
ACIC-TC-1245, TT-67-62622
Trans. of mono. Interpretatsiya Magnitnykh i Gravitatsionnykh Anomalii nad Plastoobraznym Telami, Moscow, 1963 39p.

Descriptors: (*Stratigraphy, *Gravity), (*Terrestrial magnetism, Stratigraphy), Magnetic anomaly detection, Geology, Graphics, Anomalies, USSR.

In order to minimize the difficulty of estimating magnetic and gravitational anomalies widely distributed in the upper part of the earth's crust, and to lessen difficulty of determining the parameters of the perturbing bodies, it has been accepted to compare the anomalies above stratified bodies to the anomalies above inclined layers (a body limited by two inclined and one horizontal plane). This makes it possible to study the characteristics of the anomalies and find the necessary method for the determination of the parameters of the perturbing body. In this study it is suggested that the graphic method be used for determining all the parameters of the inclined layer. For this purpose, log-log graticules, compiled for a sufficiently wide change of dimensions of the body under discussion, is recommended. (Author)
AD-656 995 HC$3.00 MF$0.65

MAIN RESULTS OF GEOPHYSICAL INVESTIGATIONS OF THE STRUCTURE OF THE EARTH'S CRUST IN THE BLACK SEA BASIN.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
B. K. Balavadze, and P. Sh. Mindeli. Aug 67, 13p
ACIC-TC-1223, TT-67-62625
Osnovnye Rezultaty Geofizicheskikh Issledovanii Stroeniya Zemnoi Kory Chernomorskogo Basseinam trans. of mono. Stroenie Chernomorskoe Vpadiny. Sbornik Statei, Moscow, 1966 p17-21.

Descriptors: (*Structural geology, Black Sea), Stratigraphy, Thickness, Sedimentary rock, Gravity, USSR.

The committee for the study of the structure and movement of the earth's crust in the Black Sea basin drew up a plan for a series of thematic investigations. This investigation was designed to accomplish the complex study of this water basin and its surrounding areas. The subject was assigned to the Geophysical Institute of the Georgian Academy of Sciences in Simferopol' in 1962. Results of investigations in this field, preliminary (1963) and final (1964) were presented in Crimea at successive meetings of the committee. The translation is a brief report of the findings: On the basis of seismic and gravimetric data, it is shown that the structure of the earth's crust in this basin, like in other inland seas, is of the intermediate type. In the central part of the basin the granite later is absent and the thickness of the crust is 22-25 km, whereas on the seacoast it is 35-45 km. The thickness of the sedimentary complex increases from 5-8 km around the sea to 15 km in the central part of the sea. (Author)
AD-656 997 HC$3.00 MF$0.65

NEOTECTONICS AS INDICATOR OF ANOMALOUS THICKNESS OF THE EARTH'S CRUST.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
V. G. Rikhter, and I. S. Volvovskii. Aug 67, 15p
ACIC-TC-1246, TT-67-62627
Neotektonika kak Pokazatel Anomalnykh Moshchnostei Zemnoi Kory, trans. of Sovetskaya Geologiya (USSR), n12 p118-23 1966.

Descriptors: (*Stratigraphy, Earth (Planet)), Thickness, Graphics, Terrain, Isostatic change, Geology, USSR.

Many geologists have devoted their investigations of recent movements of the earth's crust, and to the morphological expressions of these movements. The knowledge of the causes of the tectonic movements of the earth's crust is important because it will be helpful in decoding the regularities in the vertical motions during remote geological epochs and in the solution of the problem of energy in tectonic processes. It is important to determine whether the latter are a reflection of abyssal processes occurring in the earth's crust and the upper mantle, or if they are basically caused by external forces in relation to the earth. This translation is a study of various Soviet scientists' data, indicating the relation between thickness of the earth's crust and relief elevations. The graphic compiled by R. M. Demenitskaya is especially considered. Graphics compiled by other scientists differ from the considered one only in the regions of great oceanic depths and great elevations of the relief on the land. In order to obtain the data for the comparison, elevations of the earth's surface relief were not used. The maximum of the tectonic movements were used because they reflect more accurately the processes in the abyssal layers of the earth's crust and in its upper mantle. (Author)
AD-656 999 HC$3.00 MF$0.65

LEAD CONTAMINATION OF FLUX-GROWN GARNETS AND THE EFFECT ON OPTICAL PROPERTIES,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
L. E. Sobon, K. A. Wickersheim, J. C. Robinson, and M. J. Mitchell. 1967, 2p
Availability: Published in Journal of Applied Physics v38 n3 p1021-2 Mar 1 1967.

Descriptors: (*Garnet, Impurities), (*Synthetic stones, Garnet), Gallium, Aluminum, Crystal growth, Lead, Discoloration, Optical properties, Yttrium, Absorption, Electron microscopy, Spectra (Visible + ultraviolet).

One occasionally observes in flux-grown gallium and aluminum garnets a purple discoloration. Combined optical absorption, emission spectrographic and electron microprobe studies of crystals showing pronounced color banding indicate a direct correlation between depth of purple color and dissolved lead content. In addition to the broad visible absorption band leading to the purple color, a sharp absorption band is observed near 2.8 microns in the discolored crystals. Since the small lead impurity cannot by itself produce either of these absorptions, they must be attributed to associated charge-compensating mechanism--e.g., charged vacancies (color centers) in the one instance and OH (-) replacements for oxygen ions in the other. While it can be argued that the lead impurity must be partially self-compensating, the divalent state appears to predominate. (Author)
AD-657 077 Not available from CFSTI.

CLAY MOBILITY, PORTUGUESE BEND, CALIFORNIA,
Columbia Univ New York Dept of Geology
For primary bibliographic entry see Field 8M.
AD-657 086 HC$3.00 MF$0.65

PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUBIA RIVER EFFLUENT AREA, 1965. VOLUME II.
Washington Univ Seattle Dept of Oceanography
For primary bibliographic entry see Field 8A.
AD-657 130 HC$3.00 MF$0.65

COASTAL GEOMORPHOLOGY OF CONNECTICUT.
Final rept.,
Cornell Univ Ithaca N Y Dept of Geological Sciences
Arthur L. Bloom. 15 Jun 67, 99p
Contract Nonr-401 (45)

Descriptors: (*Geology, Connecticut), Sedimentation, Erosion, Terrain, Geologic age determination, Tides, Rock (Geology), Maps, Tables, Measurement.

The Connecticut coast has submerged about 9.7 feet (3 meters) in the last 3500 years and about 27.5 feet (8.4 meters) in the last 8000 years. The submergence rate decreased to half an earlier rate about 3500 years ago, and salt marshes then filled the formerly open bays. Since their formation, the salt marshes have built upward to keep pace with continuing submergence. Vertical accretion on selected Connecticut tidal marshes has ranged between 1 and 16 mm per year between 1962 and 1966. Typical marshes are building upward at about 4 mm per year, which approximates the regional submergence rate for recent decades. Marsh edges have eroded unusually fast in recent decades, but only minor erosion was measured during detailed surveys between 1962 and 1966. (Author)
AD-657 200 HC$3.00 MF$0.65

THEORETICAL CURVES FOR THE INDUCED POLARIZATION METHOD,
Directorate of Scientific Information Services Ottawa (Ontario)
L. L. Vanyan, G. M. Morozova, and L. V. Lozhenicyna. Jul 67, 9p Rept no. T-476-R
TT-67-62669
Trans. of Geologiya i Geofizika n10 p118-23 1961.

Descriptors: (*Geophysical prospecting, Polarization), (*Polarization, Theory), USSR, Theory, Graphics, Mathematical analysis.

The paper considers a new way of computing the apparent polarizability.
AD-657 262 HC$3.00 MF$0.65

GEOPHYSICAL STUDY OF BASIN-RANGE STRUCTURE DIXIE-VALLEY REGION, NEVADA.
Final scientific rept. (Parts 1-8) Jan 64-Dec 66,
Stanford Univ Calif Dept of Geophysics
George A. Thompson, Laurent J. Meister, Alan T. Herring, Thomas E. Smith, and Dennis B. Burke. Jul 67, 322p
AFCRL-66-848
Contract AF 19 (628)-3867

Descriptors: (*Structural geology, Nevada), (*Geophysics, Nevada), Seismic waves, Refraction, Gravity, Terrestrial magnetism, Deposits, Lakes, Faults (Geology), Earthquakes, Aerial photography, Mapping, Strain (Mechanics), Beaches, Maps, Seismology, Tables, Sedimentation, Measurement.

The study aims to determine the subsurface structure and origin of a tectonically active part of the Basin and Range province, which has structural similarities to the ocean ridge and rift system and to continental block-fault structures such as the Rift Valleys of East Africa. A variety of techniques was utilized, including seismic refraction, gravity measurements, magnetic measurements, photogeologic mapping, strain analysis of existing geodetic data, and elevation measurements on shorelines of ancient lakes. Dixie Valley contains more than 10,000 feet of Cenozoic deposits and is underlain by a complex fault trough concealed within the main graben. The bounding faults, studied by side refraction, are markedly crooked in strike and comparatively constant in dip. Dip-slip motion predominates. The computed strain energy is comparable to the energy derived from the magnitudes of the 1954 earthquakes. Ancient beach ridges record a maximum 14 feet of westward tilting in approximately the last 10,000 years; the valley has been subsiding with little net tilting. (Author)
AD-657 326 HC$3.00 MF$0.65

THE OCEAN SCIENCE PROGRAM OF THE U. S. NAVY: ACCOMPLISHMENTS AND PROSPECTS.

Office of the Oceanographer of the Navy Alexandria Va
For primary bibliographic entry see Field 8A.
AD-657 389 HC$3.00 MF$0.65

ST. PETER AND ST. PAUL ROCKS: A HIGH-TEMPERATURE, MANTLE-DERIVED INTRUSION.
Woods Hole Oceanographic Institution Mass
For primary bibliographic entry see Field 8J.
AD-657 419 Not available from CFSTI.

METAMORPHISM IN THE MID-ATLANTIC RIDGE, 22 DEGREES N LATITUDE.
Woods Hole Oceanographic Institution Mass
For primary bibliographic entry see Field 8J.
AD-657 420 Not available from CFSTI.

CALORIMETRIC STUDY OF SEVERAL RARE-EARTH GALLIUM GARNETS,
Duke Univ Durham N C
D. G. Onn, Horst Meyer, and J. P. Remeika. 14 Nov 66, 6p
Prepared in cooperation with Bell Telephone Labs., Murray Hill, N. J. Research supported in part by AROD and NONR.
Availability: Published in The Physical Review v156 n2 p663-70 Apr 10 1967.

Descriptors: (*Calorimetry, Garnet), (*Rare earths, *Garnet), Specific heat, Gallium, Transition temperature, Neodymium compounds, Samarium compounds, Gadolinium compounds, Erbium compounds, Dysprosium compounds, Holmium compounds, Ytterbium compounds.

Specific-heat measurements on the gallium garnets (GaG) of Nd, Sm, Gd, Er, Dy, Ho, and Yb between 0.35 and 4.2 K are presented. The transition to the ordered state for the garnets of Nd, Sm, and Er is studied in detail, the transition temperature TN being, respectively, 0.516, 0.967, and 0.789 K. Another Sm sample had a transition at TN = 0.921 K. From this study, the exchange coupling parameter Jcc between the rare-earth ions situated on the c sites is derived in different ways, namely, from TN, the magnetic energy, and the high-temperature specific-heat 'tail.' These determinations are found to be reasonably consistent. The entropy and magnetic energy are found to be approximately those of a Heisenberg system with spin 1/2. For GdGaG, the rounded specific-heat maximum is interpreted in terms of a Schottky anomaly. The specific-heat anomaly can be well fitted by a calculated curve assuming a cubic crystalline field. Unexpectedly, the splitting is much larger than that obtained for the diluted garnet from ESR data. For HoGaG, the specific heat shows the population of the first excited singlet at E/k = 7.4 K and a second-order hyperfine splitting at temperatures below 1 K. For YbGaG, the specific heat increases as the temperature decreases, and from the temperature region where the magnetic contribution is proportional to T (-2), the transition to an ordered state is expected at about 0.3 K. The DyGaG shows a maximum specific heat at about 0.36 K, but no satisfactory analysis could be carried out on this compound. (Author)
AD-657 426 Not available from CFSTI.

ON THE COLLECTION OF COSMIC DUST SAMPLES FOR CRYSTALLOGRAPHIC STUDY.
Stockholm Univ. (Sweden). Inst. of Meteorology.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 19.
N67-33521 HC$3.00 MF$0.65

THE CRUST AND THE UPPER MANTLE OF THE CONTINENTS.
Academy of Sciences (USSR), Moscow. Soviet Geophysical Committee.
V. V. Beloussov. 1966, 124p
in Russian, English Summary

Descriptors: *Earth mantle, *Geology, *Tectonic movement, Continent, Earth, Energy, Geophysics, Lithosphere, Mantle, Melting, Movement, Seismology, Tectonics.

For abstract, see STAR 05 19.
N67-33683 HC$3.00 MF$0.65

METAMORPHISM AND DEEP STRUCTURE OF THE NORITE- DIORITE (GRANULTIC) SERIES OF RUSSIAN LAPLAND.
Academy of Sciences (USSR), Moscow. Soviet Geophysical Committee.
V. V. Zhdanov. 1966, 65p
in Russian, English Summary

Descriptors: *Diorite, *Earth crust, *Geology, *Metamorphism, *U.S.S.R., Chemistry, Crust, Earth, Geophysics, Physics, Seismology, Structure.

For abstract, see STAR 05 19.
N67-33684 HC$3.00 MF$0.65

PROJECT MOHOLE, SCIENCE SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING NOVEMBER 15, 1963.
Brown and Root, Inc., Houston, Tex.
30 Nov 63, 37p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Geophysical prospecting, *Site selection), Oceanology, Marine engineering, Instrumentation, Marine geology, Design, Ships, Hydrodynamics, Aerodynamics, Model tests, Position finding, Power supplies, Communication systems, Helicopters, Logistics, Hoists, Pumps, Scheduling.
Identifiers: Mohole project.

Contents: Oceanographic studies; Logging program; Site selection; Platform design; Structural analysis; Hydrodynamics and aerodynamics; Model test program; Platform positioning; Power generation; Communications; Supply ship and helicopters; Derrick and substructure; Pipe handling system; Hoisting system; Rotating equipment; Hydraulic and pneumatic power; Mud pumps and requirements; Drilling fluids program; Drill pipe; Riser system; Base and connections; Hole re-entry instrumentation; Down-hole drills; Logistics; Critical path method of scheduling Project Mohole; Project schedule.
PB-175 000 HC$3.00 MF$0.65

PROJECT MOHOLE, NAVAL ARCHITECTURE, MARINE ENGINEERING AND INSTRUMENTATION SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING NOVEMBER 15, 1963.
Brown and Root Inc., Houston, Tex.
30 Nov 63, 55p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Floating bodies, Drilling machines), (*Ships, Design), Marine engineering, Stability, Damage, Structural properties, Fluid dynamic properties, Model tests, Position finding, Marine propulsion, Electric power production, Communication systems, Logistics.
Identifiers: Mohole project.

Contents: Platform design; Structural analysis; Hydrodynamics and aerodynamics; Model test program; Platform positioning; Power generation; Communications; Supply ship and helicopters.
PB-175 001 HC$3.00 MF$0.65

MOHOLE PLATFORM EQUATIONS OF MOTION FOR DYNASAR PROGRAM.
Scientific and technical progress for the period ending 15 Nov 63,
General Electric Co., Schenectady, N. Y. Advanced Technology Labs.
J. Bain. 30 Nov 63, 38p 63GL122
Contract NSF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex.

Descriptors: (*Well logging, Feasibility studies), (*Equations of motion, Floating bodies), Ships, Drilling machines, Motion, Simulation, Force (Mechanics), Moments, Roll, Pitch (Motion), Ocean waves, Integrals.
Identifiers: Mohole project, Dynasar.

This report documents the equations of motion used in the Dynasar simulation of the Mohole platform motions. (Author)
PB-175 002 HC$3.00 MF$0.65

MOHOLE PLATFORM STUDIES: AN INTERIM REPORT.
Scientific and technical progress for the period ending 15 Nov 63.
General Electric Co., Schenectady, N. Y. Advanced Technology Labs.
30 Nov 63, 33p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ships, Motion), Frequency, Floats, Drilling machines, Stresses, Loading (Mechanics), Equations of motion.
Identifiers: Mohole project, Drilling vessels.

The purpose of these calculations was to obtain the natural frequencies of the MOHOLE vessel taken as a free-floating elastic structure. From these natural frequencies one can make qualitative judgments about the dynamic stresses imposed by oscillating loads. The determination of these frequencies (and associated natural modes) is also a first step toward a quantitative determination of dynamic stresses. The stiffness matrix, which must be found to determine natural frequencies and modes, is also a valuable tool for the determination of stresses imposed either by dynamic or static loads. (Author)
PB-175 003 HC$3.00 MF$0.65

SIMPLIFIED MOTION EQUATIONS FOR MOHOLE PLATFORM.
Scientific and technical progress for the period ending 15 Nov 63,
General Electric Co., Schenectady, N. Y. Advanced Technology Labs.
J. Bain. 30 Nov 63, 75p 63GL121
Contract NSF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex. See also AD-175 002.

Descriptors: (*Well logging, Feasibility studies), (*Equations of motion, Floating bodies), Ships, Drilling machines, Simulation, Tests, Roll, Analog systems, Oscillation, Damping, Pitch (Motion).
Identifiers: Mohole project.

The report documents the equations of motion used in the analog simulation of the Mohole platform. These equations are simplified versions of those now being used in the Dynasar solution of this problem. (Author)
PB-175 004 HC$3.00 MF$0.65

A STUDY OF VESSEL POSITION DISPLAY SYSTEMS.
Scientific and technical progress for the period ending 15 Nov 63.
Honeywell, West Covina, Calif. California Ordnance Center.
30 Nov 63, 36p MH-6145-002
Contract NSF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex., subcontract 63-04.

Descriptors: (*Well logging, Feasibility studies), (*Position finding, Display systems), Floating bodies, Ships, Drilling machines, Sonar equipment, Radar equipment, Transponders.
Identifiers: Mohole project.

This is the report of a preliminary study of the possible display systems which might be used for Project Mohole vessel positioning. As a result of this study the following recommendations are made: (1) All displays should be hole centered. (2) All displays should be north oriented (True). (3) Multiple display units with fixed scale factors should be used, as follows: Display Unit 1: Vessel Location with respect to drill hole. Display Unit 2: Subsurface Sonar buoy and Radar Transponder positions. Display Unit 3: Deep Sea Sonar Transponder position. (4) The characteristics of the Display System are shown. (5) Emergency and Auxiliary Displays are required as noted in subsequent sections of this report. A discussion, dealing with a number of vessel parameters which might be displayed is contained in this report; however, final decisions on this subject must be deferred until additional data resulting from other studies becomes available.
PB-175 005 HC$3.00 MF$0.65

DATA REQUIRED FROM DRILLING PLATFORM MODEL TESTS ON MOHOLE PROJECT.
Scientific and technical progress for the period ending 15 Nov 63.
Honeywell, West Covina, Calif. California Ordnance Center.
30 Nov 63, 14p MH-6145-001
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Model tests), Equations of motion, Data, Drilling machines, Floats, Ocean waves.
Identifiers: Mohole project, Drilling vessels.

The report lists the data required from the drilling platform model tests and presents the drilling platform equations of motion in which the data will be used to investigate the vessel positioning system performance. In additional sections of the report the terms of the equations are defined and the assumptions which have been made are listed. (Author)
PB-175 006 HC$3.00 MF$0.65

PROJECT MOHOLE, DRILLING SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING NOVEMBER 15, 1963.
Brown and Root, Inc., Houston, Tex.
30 Nov 63, 119p
Contract NSF-C-260
See also PB-175 022.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Structures, Pipes, Positioning devices (Machinery), Hoists, Cutting fluids, Pumps, Drills, Pneumatic systems, Hydraulic systems, Pipe fittings, Drilling, Underwater equipment.
Identifiers: Mohole project.

Contents: Derrick and substructure; Pipe handling system; Hoisting system; Rotating equipment; Hydraulic and pneumatic power; Mud pumps and requirements; Drilling fluids program; Drill pipe; Riser system; Base and connections; Hole reentry instrumentation; Down-hole drills; Logistics.
PB-175 007 HC$3.00 MF$0.65

PROJECT MOHOLE, SCHEDULING SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING NOVEMBER 15, 1963.
Brown and Root, Inc., Houston, Tex.
30 Nov 63, 24p
Contract NSF-C-260
See also PB-175 027.

Descriptors: (*Well logging, Feasibility studies), (*Scheduling, Research program administration), Management engineering, Diagrams, Drilling.
Identifiers: Mohole project.

The report presents the critical path method of scheduling Project Mohole and includes the basic CPM activity network.
PB-175 008 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING DECEMBER 15, 1963.
Brown and Root, Inc., Houston, Tex.
31 Dec 63, 49p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Geophysics, Oceanology, Floats, Ships, Drilling machines, Hydrodynamics, Model tests, Propellers (Marine), Power, Generators, Drilling, Pipes, Instrumentation.
Identifiers: Mohole project.

Contents: Science (geophysics, oceanography); Naval architecture, marine engineering and instrumentation (platform design, structural analysis, hydrodynamics and model tests, positioning system, power generation); Drilling (derrick and substructure, pipe handling, rotating equipment, drill pipe, riser system, down-hole drills, drilling instrumentation).
PB-175 009 HC$3.00 MF$0.65

ALTERNATE VESSEL POSITIONING SYSTEM.
Monthly progress rept.,
GM Defense Research Labs., Santa Barbara, Calif.
T. Baker, L. Blickley, and D. Potter. 8 Nov 63, 35p
Contract NSF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex., subcontract 63-35.

Descriptors: (*Well logging, Feasibility studies), (*Position finding, Ships), Radar navigation, Radar equipment, Drilling, Sensors, Control systems, Pipes.
Identifiers: Mohole project.

This report covers the activities undertaken during the first reporting period, October 1 to October 31, 1963 on Subcontract 63-35. The report is divided into separate areas: (1) Short baseline platform positioning studies; (2) Modulated radar devices; (3) Drill hole reentry system, (A) Reentry system sensor studies, (B) Reentry system control studies.
PB-175 010 HC$3.00 MF$0.65

REVIEW OF POSITIONING SYSTEMS ON MOHOLE PROJECT.
Scientific and technical progress for the period ending 15 Dec 63,
Honeywell, West Covina, Calif. California Ordnance Center.
William Allen, Jr. 31 Dec 63, 22p MH-6146-1128-1
Contract NSF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex.

Descriptors: (*Well logging, Feasibility studies), (*Position finding, Ships), Sonar, Radar navigation, Radio navigation, Radio equipment, Floating bodies, Drilling machines, Reviews, Positioning devices (Machinery).
Identifiers: Mohole project.

The use of radar and sonar systems has been fairly well established for positioning the Mohole drill ship. It is deemed desirable to investigate briefly other possible systems and to determine if any alternates are available. In the ocean, acoustic propagation is the only known means of ranging; in the air, however, a great many radio frequency systems exist that might be applicable. This report is intended to cover not only the possible systems, but to establish general guidelines for the design of those selected. (Author)
PB-175 011 HC$3.00 MF$0.65

PROJECT MOHOLE, DRILLING SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING DECEMBER 15, 1963.
Brown and Root, Inc., Houston, Tex.
31 Dec 63, 32p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Drills, Instrumentation, Design, Cutting fluids, Drilling machines, Viscosity, Tensile properties, Steel, Tachometers, Stresses, Fatigue (Mechanics), Corrosion.
Identifiers: Mohole project.

In the drilling activities section, a scale working model of the derrick and substructure has been completed and is currently being used to facilitate rig-floor arrangement and drilling techniques planning. Tests have been conducted on a drilling rig to determine the feasibility of handling long stands of drill pipe without subjecting this pipe to stresses that might cause bending. The search for the most suitable drill pipe continues. Testing programs are in progress to determine corrosion fatigue and other characteristics of S-135 drill pipe. Mill tests are planned for other alloy steels. Full scale fatigue testing of drill pipe (something that has not been done by the petroleum industry) is being subjected to feasibility studies. One of the most important accomplishments in down-hole drills has been the successful shop testing of the Dresser turbodrill. Although all of the instrumentation was not finished and was not included in this test, the operation of the inner core tube and the magnetic tachometer proved satisfactory; also, the operation of the tool with certain drill fluid additives (such as fluid friction reducers and lost return materials) was successful. In regard to drilling instrumentation, work is proceeding in the development of a sensitive weight indicator and other instruments for determining drilling conditions. (Author)
PB-175 012 HC$3.00 MF$0.65

MOHOLE PROJECT TECHNICAL REPORT ON LINEAR LATCH DESIGN.
Scientific and technical progress for the period ending 15 Dec 63.
Brown and Root, Inc., Houston, Tex.
31 Dec 63, 41p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Positioning devices (Machinery), Pipes), Drilling, Design, Pipe fittings, Mechanical fasteners, Automatic, Disconnect fittings.
Identifiers: Mohole project.

A liner latch, together with a running tool and a liner hanger tool, have been designed and working scale models have been completed.
PB-175 013 HC$3.00 MF$0.65

PHYSICAL TESTS ON KNIPPA BASALT AND PINK QUARTZITE CORES.
Scientific and technical progress for the period ending 15 Dec 63.
Hughes Tool Co., Houston, Tex.

31 Dec 63, 15p
Contract NSF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex.

Descriptors: (*Well logging, Feasibility studies), (*Basalt, Mechanical properties), (*Quartz, Mechanical properties), Tests, Compressive properties, Bending, Tensile properties, Experimental data.
Identifiers: Mohole project.

The results of tests indicate that the 2 inch core catchers have enough holding ability to allow for breaking of the subject 2 inch diameter Knippa Basalt and Pink Quartzite specimens under the laboratory conditions. It is noted however that loading rates in excess of 100 lbs./second will probably be required to prevent slipping. (Author)
PB-175 014 HC$3.00 MF$0.65

SPECTROSCOPIC ANALYSIS OF TRACER MATERIALS IN DRILLING FLUID.
Technical rept.,
Brown and Root, Inc., Houston, Tex.
W. F. Walker. 4 Nov 63, 26p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Tracer studies, Well logging), Maintenance, Drilling machines, Spectroscopy, Drills, Wear resistance, Hydrodynamics, Labeled substances, Floating bodies, Marine geology, Fluorescence, Instrumentation, Tachometers, X-ray absorption analysis, Sampling, X-ray diffraction analysis, Spectrometers.
Identifiers: Mohole project.

The report discusses spectroscopic analysis as it applies to the determination of wear of down-hole components without necessity of tripping out at frequent intervals.
PB-175 015 HC$3.00 MF$0.65

FEASIBILITY REPORT ON CRYOGENIC NITROGEN BUOY ACTIVATION SYSTEM.
Scientific and technical progress for the period ending 15 Dec 63.
Brown and Root, Inc., Houston, Tex.
31 Dec 63, 55p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Buoys, Excitation), Pipes, Supports, Nitrogen, Cryogenics, Buoyancy, Storage.
Identifiers: Mohole project.

To provide for activation of sea water displacement type buoys used to support part of the riser casing system load it will be necessary to supply compressed air, or other gases, to the buoys from the rig floor. The requirements for buoyancy are variable and dependent upon the operating conditions. The amount of gas needed to produce the required buoyancy is a function of the amount of sea water to be displaced and the temperature and pressure of the gas causing the displacement. The gas temperature, if not initially at ambient in the vicinity of the buoys, will eventually equalize to this value; and the pressure is controlled by the depth (sea water head) at which the gas-water interface is located. The major requirement for sea water displacement buoyancy is a reserve for emergency conditions to permit suspension of the drill string within the riser casing if it should become necessary to move the drilling rig from the location quickly. For suspension of the maximum anticipated drill string length about 550 kips of buoyancy will be needed. A feasibility study was performed to determine the prospects for storing the gas at cryogenic temperatures in the liquid state and at or near atmospheric pressure. This report summarizes the findings.
PB-175 016 HC$3.00 MF$0.65

SCIENCE SECTION.
Project MOHOLE scientific and technical progress for the period ending 31 Jan 64.
Brown and Root, Inc., Houston, Tex.
31 Jan 64, 69p
Contract NSF-C-260
Availability: Microfiche only after original copies are exhausted.

Descriptors: (*Well logging, Feasibility studies), (*Marine engineering, Well logging), Site selection, Sedimentation, Design, Models (Simulations), Structural properties, Pipes, Seismic waves, Refraction, Hawaii.
Identifiers: Mohole project, Mantle (Geology).

The report briefly describes progress during the reporting period in the areas of naval architecture, marine engineering, and drilling. In addition, reproductions of the work-sheet plots of seismic refraction data from the Hawaiian Arch are included in the report.
PB-175 017 MF$0.65

PROJECT MOHOLE, NAVAL ARCHITECTURE, MARINE ENGINEERING AND INSTRUMENTATION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING JANUARY 15, 1964.
Brown and Root, Inc., Houston, Tex.
31 Jan 64, 25p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Floating bodies, Drilling machines), (*Ships, Design), Marine engineering, Fluid dynamic properties, Model tests, Structural properties, Weight, Position finding, Sonar equipment, Radar equipment.
Identifiers: Mohole project.

Contents: Platform design; Hydrodynamics and model tests; Machinery and hull systems; Supply vessel; Vessel positioning system; Communications; Power generation.
PB-175 018 HC$3.00 MF$0.65

PROJECT MOHOLE - DRILL PLATFORM POSITIONING COMPUTER.
Scientific and technical progress for period ending 15 Jan 64.
Honeywell, West Covina, Calif. California Ordnance Center.
31 Jan 64, 38p MH-6145-003
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Analog computers, Position finding), Floats, Buoys, Signals, Sonar equipment, Transponders, Marine propulsion, Radar.
Identifiers: Mohole project.

The drill platform positioning computer is an analog computer capable of accepting range information from any one of the various buoy reference systems and converting the information to platform positioning signals. Essentially, the computer compares range information to preset computer constants and from this derives platform positioning signals that are proportional to the difference between the two. (Author)
PB-175 019 HC$3.00 MF$0.65

PROJECT MOHOLE: DATA REQUIRED FROM DRILLING PLATFORM MODEL TESTS.
Scientific and technical progress for period ending 15 Jan 64.
Honeywell, West Covina, Calif. California Ordnance Center.
31 Jan 64, 27p MH-6145-001
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Model tests), Equations of motion, Ship hulls, Floats, Drilling machines, Data.
Identifiers: Mohole project, Drilling vessels.

The report lists the data required from the drilling platform model tests and presents the drilling platform equations of motion in which the data will be used to investigate the vessel positioning system performance. In additional sections of the report the terms of the equations are defined and the assumptions which have been made are listed. A supplementary report is included which amplifies the data requirements. (Author)
PB-175 020 HC$3.00 MF$0.65

PROJECT MOHOLE: ALTERNATE VESSEL POSITIONING SYSTEM.
Monthly progress rept,
GM Defense Research Labs., Santa Monica, Calif.
T. Baker, L. Blickley and D. Potter. 30 Nov 63, 39p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Propellers (Marine), Design), Ships, Floats, Radar equipment, Reliability, Drilling machines, Hydrophones.
Identifiers: Mohole project, Drilling vessels.

The report is divided into separate areas based on the division of activities: (1) Short baseline platform positioning studies; (2) modulated radar devices; (3) drill hole reentry system (reentry system sensor studies, reentry system control studies); (4) reliability program.
PB-175 021 HC$3.00 MF$0.65

PROJECT MOHOLE, DRILLING SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING JANUARY 15, 1964.
Brown and Root, Inc., Houston, Tex.
31 Jan 64, 23p
Contract NSF-C-260
See also PB-175 037.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Couplings, Pipes, Drilling, Drills, Cutting fluids, Instrumentation.
Identifiers: Mohole project.

Contents: Rotating equipment; Drill pipe; Down-hole drills; Drilling fluids; Drilling instrumentation.
PB-175 022 HC$3.00 MF$0.65

CONTINUATION OF A STUDY OF FATIGUE AND OTHER RELATED PROBLEMS ASSOCIATED WITH DRILL PIPE AND CASING MATERIALS FOR PROJECT MOHOLE.
Scientific and technical progress for the period ending 15 Jan 64.
Battelle Memorial Inst., Columbus, Ohio.
31 Jan 64, 31p
Contract NCF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), (*Steel, Pipes), Stresses, Titanium alloys, Corrosion, Corrosion inhibition, Crack propagation, Damage, Fracture (Mechanics), Toughness, Life expectancy, Zinc coatings, Drop testing, Abrasive blasting.
Identifiers: Mohole project.

Drill pipe, and its related components such as tool joints, continue to be investigated in various ways:

endurance limit determinations of drill pipe material, under various operating conditions, continue at Battelle; full scale testing of the equipment required is under serious consideration; stress analysis programs, proposed by staff, are being submitted to industry for appraisal. Alternate steels, which would fit into the latter part of the Project operations, are being investigated. Tests for various characteristics of unique alloy steels, such as titanium, have been undertaken. Such tests include a determination of galling characteristics and weldability. A full report of these programs is included within the appendix of the drilling section of this publication. Drill pipe (and other equipment) corrosion and corrosion protection methods are under serious study. (Author)
PB-175 023 HC$3.00 MF$0.65

GALLING, BUCK-UP AND MECHANICAL PROPERTIES TESTS ON TITANIUM ALLOY.
Scientific and technical progress for the period ending 15 Jan 64.
Hughes Tool Co., Houston, Tex.
31 Jan 64, 40p
Contract NSF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex.

Descriptors: (*Well logging, Feasibility studies), (*Titanium alloys, *Couplings), Machining, Microstructure, Performance (Engineering), Aluminum alloys, Vanadium alloys, Disconnect fittings, Mechanical properties, Experimental data.
Identifiers: Titanium alloy 6Al 4V, Mohole project.

The results of galling, buck-up and physical tests on titanium alloy tool joints are presented.
PB-175 024 HC$3.00 MF$0.65

PRELIMINARY REPORT ON SHOP TEST OF CORING TURBODRILL.
Scientific and Technical Progress for the period ending 15 Jan 64.
Brown and Root, Inc., Houston, Tex.
31 Jan 64, 25p
Contract NSF-C-260
Rept. on proj. MOHOLE.

Descriptors: (*Well logging, Feasibility studies), (*Drills, Well logging), Turbines, Tests, Performance (Engineering), Experimental data.
Identifiers: Mohole project.

The 8-1/2 inch coring turbodrill was assembled, tested and disassembled. In addition, tests were run to check the effect of viscoelastic and lost circulation materials in operation with the turbodrill. An endurance test also was run on the viton thrust and radial bearings of this tool.
PB-175 025 HC$3.00 MF$0.65

PROJECT MOHOLE, TURBODRILL INSTRUMENTATION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING JANUARY 15, 1964.
Brown and Root, Inc., Houston, Tex.
31 Jan 64, 28p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drills, Turbines), Performance (Engineering), Tests, Velocity, Wear resistance, Instrumentation, Electric cables.
Identifiers: Mohole project.

The report describes the methods and techniques that presently exist in the turbodrill instrument package to measure and present the various turbodrill parameters. It should be emphasized that this is a prototype at best and that the tests performed and operational evaluation will in all probability dictate changes in the existing design. (Author)
PB-175 026 HC$3.00 MF$0.65

PROJECT MOHOLE, SCHEDULING, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING JANUARY 15, 1964.
Brown and Root, Inc., Houston, Tex.
31 Jan 64, 22p
Contract NSF-C-260
See also PB-175 008 and PB-175 062.

Descriptors: (*Well logging, Feasibility studies), (*Scheduling, Research program administration), Management engineering, Diagrams, Drilling.
Identifiers: Mohole project.

A revised Project schedule in the form of a CPM activity network is presented. A review of this drawing indicates that the critical path remains with the design, construction, and testing of the drilling platform. A critical path responsibility code early start sequence is also presented.
PB-175 027 HC$3.00 MF$0.65

DEVELOPMENT OF DRILLING FLUID FRICTION ADDITIVES FOR PROJECT MOHOLE.
Project MOHOLE scientific and technical progress for the period ending 31 Jan 64,
Pan American Petroleum Corp., Tulsa, Okla. Research Dept.
J. L. Lummus, and B. V. Randall. 13 Jan 64, 39p
Contract NSF-C-260
Prepared in cooperation with Brown and Root, Inc., Houston, Tex. under subcontract 62-02.

Descriptors: (*Well logging, Feasibility studies), (*Skin friction, *Additives), Drilling machines, Wear resistance, Drills, Viscoelasticity, Fluids, Thermal properties, Stability, Polymers, Sea water, Bacteria.
Identifiers: Mohole project.

The report contains development of drilling fluid friction additives for use in Phase II of the Mohole Project. An extensive literature survey was conducted on viscoelastic fluids, rheology measurements, friction reductions, polymers, and natural gums. The results of these tests showed that flax meal in a concentration of approximately 6 pounds per barrel will reduce the pressure loss incurred when pumping sea water by 50 percent, and RV-13, a product of the Nalco Chemical Company, in a concentration of from 0.2 to 0.5 pounds per barrel will also reduce pressure losses by approximately 50 percent. The flax meal is recommended for drilling where heat stability and resistance to bacterial action are not required characteristics. RV-13 is not affected by bacteria and various contaminates and is usable to a temperature of at least 350F. Based on large scale test results using flax meal and RV-13, pressure drop and bit cutting transport data have been calculated for the Mohole. (Author)
PB-175 028 HC$3.00 MF$0.65

PROJECT MOHOLE, SCIENCE SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING FEBRUARY 15, 1964.
Brown and Root, Inc., Houston, Tex.
20 Feb 64, 24p
Contract NSF-C-260
Included Appendix SC: Gravity Meter Exploration Co., 'Aeromagnetic Interpretation Puerto Rico Trench'.

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Instrumentation, Sedimentation, Magnetic fields, Intensity, Puerto Rico.
Identifiers: Mohole project.

The test program on drill pipe has continued, and additional work in the area of cumulative fatigue has been proposed by the staff to supplement the Battelle work. In this same field, preliminary discussions also have been made with Curtiss-Wright to perform certain fatigue studies; a proposal is being prepared for this work. Fatigue tests on full-size drill pipe continue in certain manufacturing plants at Houston. Corrosion protection is currently being studied by Battelle and Pan American Petroleum Corporation. A report, 'Aeromagnetic Interpretation, Puerto Rico Trench,' by Gravity Meter Exploration Company, is included with this progress report. This structural interpretation of the magnetic data used techniques developed during the interpretation, over a period of many years, of more than a million square miles of aeromagnetic coverage acquired for the purpose of petroleum exploration. (Author)
PB-175 029 HC$3.00 MF$0.65

PROJECT MOHOLE, NAVAL ARCHITECTURE, MARINE ENGINEERING AND INSTRUMENTATION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING FEBRUARY 15, 1964.
Brown and Root, Inc., Houston, Tex.
29 Feb 64, 13p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Marine engineering, Propellers (Marine), Power, Generators, Communication systems, Drilling, Geophysics, Instrumentation.
Identifiers: Mohole project.

Contents: Science; Naval architecture, marine engineering and instrumentation; Drilling.
PB-175 030 HC$3.00 MF$0.65

MOHOLE ACOUSTIC NOISE TESTS. BLUEWATER RIG NO. 1,
Brown and Root, Houston, Tex.
Paul M. Mettert. 18 Dec 63, 39p
Contract NSF-C-260
Previously announced as PB-167 136.

Descriptors: (*Well logging, Feasibility studies), (*Noise, Drilling), Drilling machines, Underwater sound, Graphics, Experimental data, Floating bodies.
Identifiers: Drilling vessels, Mohole project.

Acoustic noise tests were conducted on the Bluewater Rig no. 1 in the Gulf of Mexico, 70 miles offshore from Grand Isle. Water depth was 280 feet. Noise measurements were made at six positions. During measurements at Position A, the rig was drilling the initial well. The remaining measurements were made during reaming operations, which consisted of increasing the hole size from about 10 inches to about 20 inches. In addition to noise measurements of the Blue Water platform, a spectrum of self noise was taken on the M/V BLACK DUCK at a range of four miles from the rig. This curve is shown with the Knudson curve at Sea State 2 (approximately two foot wave height). There was no change of ambient noise with the hydrophone at 20 feet deep or 80 feet deep.
PB-175 031 HC$3.00 MF$0.65

PROJECT MOHOLE: REVIEW OF POSITIONING SYSTEMS.
Engineering rept.,
Honeywell, Inc., Seattle, Wash. Ordnance Div.
K. V. Pearson. 15 Nov 63, 45p MH-6146-1128-2
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Buoys, Radar equipment), Propellers (Marine), Marine propulsion, Beacons, Position finding.
Identifiers: Mohole project.

Following a review of several possible implementations of the radar buoy tracking requirement,

a flexible, redundant system was configured. Parametric studies and review of practical factors have identified three major possibilities for the basic radar-buoy detection loop. A commercial marine radar is utilized in every instance.
PB-175 032 HC$3.00 MF$0.65

PROJECT MOHOLE: POSITIONING BUOY DESIGN; PRELIMINARY REPORT ON CONFIGURATION AND DRAG OF A SINGLE-POINT MOOR.
Engineering rept.,
Honeywell, Inc., Seattle, Washington. Ordnance Div.
J. V. Peterson, and William Allen, Jr. 30 Dec 63, 54p MH-6146-1128-3
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Buoys, Design), Propellers (Marine), Configuration, Drag, Mooring buoys.
Identifiers: Mohole project.

The report covers the investigation of single-point taut-wire buoys. The configurations covered are the best of many investigated during the study. Most of the discarded configurations had unmanageable float sizes or excessive horizontal displacement. A buoy scope of 500 feet was originally selected as a design target. This figure has proven impractical due to cable limitations, and an alternate design is covered which considers these limitations. The scope in this design is increased to almost 800 feet under worst case design conditions. Calculations for less than worst case conditions indication that the scope is well within the 500 foot limit. Some investigation of three-point buoy systems was undertaken when studies indicated that the simpler single point buoys could not provide a desired range of buoy displacement. First observations show that three point moors could restrain buoy movement to less than 300 feet. Therefore, investigation of the three-point moor system will be continued. (Author)
PB-175 033 HC$3.00 MF$0.65

PROJECT MOHOLE: ANALYSIS OF BOTTOM TRANSPONDER SYSTEM POSITIONING ERRORS.
Engineering rept.,
Honeywell, Inc., Seattle, Wash. Ordnance Div.
Jack T. Shaw. 20 Dec 63, 34p MH-6146-1128-4
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Transponders, Position finding), Errors, Marine propulsion, Configuration, Analysis.
Identifiers: Mohole project.

The fixed and variable position errors were separately calculated for square transponder configurations having depth to horizontal range ratios of 1:1 and 6:1 for an assumed depth of 18,000 feet. For all configurations, it was considered that position would be computed either from adjacent or opposing transponders. The errors were computed separately for each case at distances of 500, 1000 and 1500 feet from a given coordinate axis. Using the same worst case conditions for each parameter in computing the fixed and variable errors, the calculations point out that a considerable increase in position accuracy would result when the longer baseline configuration is used and also when position is computed from opposing rather than adjacent transponders. The most significant error in all sets of calculations is the variable error introduced where unequal average sound velocities occur on different transmission paths. The worst case condition used for this parameter was a +2 or -2 ft/sec. difference in velocity. Using the 1:1 configuration and computing position from opposing transponders, the maximum coordinate error at any location within a 3000 foot square area would be less than plus or minus 41.0 feet under the conditions selected. (Author)
PB-175 034 HC$3.00 MF$0.65

DESIGN STUDY - DRILLING PLATFORM MOTOR CONTROLS ON PROJECT MOHOLE.
Engineering rept.
Honeywell, West Covina, Calif. California Ordnance Center.
13 Dec 63, 22p MH-6145-004
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Propellers (Marine), *Marine engines), Marine propulsion, Control systems, Drilling machines, Floats, Ships, Steering, Design.
Identifiers: Mohole project.

Contents: Control system philosophy; Drilling platform motor controls description; Port positioning units, heading control; Starboard positioning units, heading control; Port positioning units, thrust control; Starboard positioning units, thrust control; Main propulsion units - thrust control.
PB-175 035 HC$3.00 MF$0.65

PROJECT MOHOLE: ALTERNATE VESSEL POSITIONING SYSTEM.
Monthly progress rept.,
GM Defense Research Labs., Santa Barbara, Calif.
T. Baker, L. Blickley, and D. S. Potter. 31 Dec 63, 53p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Propellers (Marine), Design), Marine propulsion, Radar equipment, Reliability, Floats, Sensors.
Identifiers: Mohole project, Drilling vessels.

The report is divided into separate sections: (1) Short baseline platform positioning studies; (2) modulated radar devices; (3) drill reentry system; (4) reliability program.
PB-175 036 HC$3.00 MF$0.65

PROJECT MOHOLE, DRILLING SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING FEBRUARY 15, 1964.
Brown and Root, Inc., Houston, Tex.
29 Feb 64, 17p
Contract NSF-C-260
See also PB-175 052.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Couplings, Pipes, Drilling, Instrumentation, Underwater equipment, Drills.
Identifiers: Mohole project.

Contents: Rotating equipment; Drill pipe; Riser system; Re-entry instrumentation; Drilling instrumentation; Down-hole drills.
PB-175 037 HC$3.00 MF$0.65

PROJECT MOHOLE, NAVAL ARCHITECTURE, MARINE ENGINEERING AND INSTRUMENTATION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING FEBRUARY 15, 1964.
Brown and Root, Inc., Houston, Tex.
29 Feb 64, 25p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Sedimentation, Reflection, Terrain, Fatigue (Mechanics), Corrosion, Design, Instrumentation, Accuracy, Drilling machines, Power, Tests, Puerto Rico.
Identifiers: Mohole project.

In Geophysics, a structural interpretation of the magnetic data obtained during a survey of the Puerto Rico Trench area has been completed and found to substantiate the reflection data which (previously) indicated a rugged topography underlying uniformly bedded sediments. In regard to the selection of power generation equipment, evaluation of proposals and manufacturing facilities and the inspection of equipment service records has continued. The test program on drill pipe has continued, and additional work in the area of cumulative fatigue has been proposed by the staff to supplement the Battelle work. In this same field, preliminary discussions also have been made with Curtiss-Wright to perform certain fatigue studies; a proposal is being prepared for this work. Fatigue tests on full-size drill pipe continue in certain manufacturing plants at Houston. Corrosion protection is currently being studied by Battelle and Pan American Petroleum Corporation. The riser system has been the subject of concentrated study, with particular efforts being made to improve the design of upper elements of the system such as the riser suspension and guide assembly. The principal activity associated with down-hole drills centers around the final testing and fitting of the coring turbodrill and its instrument package. (Author)
PB-175 038 HC$3.00 MF$0.65

FEASIBILITY STUDY FOR BRIDLE SYSTEM.
Project MOHOLE scientific and technical progress for the period ending 29 Feb 64.
Brown and Root, Houston, Tex.
30 Dec 63, 40p
Contract NSF-C-260
Previously announced as PB-167 143.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Positioning devices (Machinery)), Supports, Cables (Mechanical), Floating bodies, Bending, Moments, Stresses.
Identifiers: Mohole project.

As a result of studies and calculations of stresses induced in the riser pipe it is concluded that a restraining bridle placed around the riser casing at a point below the water level will definitely improve the stress distribution pattern in the riser and materially reduce the maximum stress. The design evolved was predicated on the assumption that 11 3/4 inch - 54 lb. casing would be used in the section between the drilling vessel and the upper buoy. However, the feasibility study calculations and curves in the Appendix, referred to in Section 4.0, also show stress values for 16 inch and 20 inch pipe, which makes it apparent that lower stresses will be encountered if larger diameter or heavier wall pipe is used in this section. Also, these feasibility data indicate that the displacement of the bridle collar should be held to a reasonable minimum because of the high stresses encountered with increasing travel and that stresses may be reduced by minimizing initial tension in the upper riser. Final selection of a size and material for the upper riser will depend upon a more comprehensive stress analysis which will account for dynamic effects of drilling vessel movements. However, the results of this study do indicate that a bridle system will reduce the critical stress in the riser at the vessel. (Author)
PB-175 039 HC$3.00 MF$0.65

TECHNICAL REPORT ON 10' DIAMETER HOLLOW GLASS SPHERES FOR BROWN AND ROOT, INC., PROJECT MOHOLE.
Corning Glass Works, N. Y.
W. J. Lekki. Feb 64, 8p
Contract NSF-C-260
See also PB-167 144.

Descriptors: (*Well logging, Feasibility studies), (*Glass, Spheres), Coatings, Impact shock, Shock resistance, Deep water, Oceanographic equipment, Buoyancy, Tests.
Identifiers: Mohole project.

It was determined that the 10 inch diameter tested hollow glass spheres are completely adequate for oceanographic work requiring a bouyancy unit to withstand pressures in excess of 10,000 PSI. It is recommended that these spheres be suitably coated to improve their impact strength. Such spheres when used in large quantities can be manufactured to sell for considerably less than $1.00 a pound of bouyancy. After considerable study of various flotation materials available for deep water applications, it becomes apparent that glass is probably one of the most feasible as well as the least expensive materials.
PB-175 040 HC$3.00 MF$0.65

PROJECT MOHOLE, SCIENCE SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING MARCH 15, 1964.
Brown and Root, Inc., Houston, Tex.
31 Mar 64, 14p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Pipes), Instrumentation, Design, Specifications, Drilling machines, Corrosion, Steel, Cutting fluids, Stresses, Pumps, Effectiveness, Friction, Sensors.
Identifiers: Mohole project.

Two conceptual designs for derrick and substructure have been completed by the Project staff. One design incorporates a derrick 147 ft high and is for use with the horizontal pipe racking system. Drill pipe continues to undergo an intensive research and development program. Design drawings of a full-scale testing machine have been reviewed by the staff and a recommendation, together with a final design report, was prepared. The current fatigue tests on full-size drill pipe, using the rotating beam method, is proceeding on schedule and will be concluded in early April. This testing is being conducted on 24 samples of S-135 drill pipe. (Author)
PB-175 041 HC$3.00 MF$0.65

PROJECT MOHOLE, SCIENCE SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING MARCH 15, 1964.
Brown and Root, Inc., Houston, Tex.
31 Mar 64, 51p
Contract NSF-C-260
Summary identified as PB-165 038. See also PB-175 041, summary.

Descriptors: (*Well logging, Feasibility studies), (*Geophysics, *Site selection), (*Hoists, Well logging), Electric cables, Marine geology, Marine meteorology, Atlantic Ocean, Pacific Ocean, Mechanical properties, Corrosion, Mechanical drawings, Seismology, Position finding, Depth finding.
Identifiers: Mohole project.

The reconnaissance seismic work performed at Barracuda Fault in early 1963 suggested possible mantle depths as shallow as 8-1/2 kilometers. A geophysical program was planned to investigate this possibility thoroughly. The program is to include nine reversed refraction profiles 40 to 50 km long; 470 km of reflection profiling; and 2300 km of gravity meter and magnetometer profiling. A letter from Dr. Menard of Scripps Institution of Oceanography to the National Science Foundation proposes consideration of a new potential Mohole site at the Manihiki Rise in the South Pacific. The essence of the argument is that the Manihiki Rise is a regionally important anomaly which has not yet been investigated by seismic exploration. A pre-print copy of 'Reflection and Velocity Profiles at the Outer Ridge, Puerto Rico' by Savit et al describes the reflection data obtained as accessory to the refraction profiling performed to evaluate this potential site. Illustrations of the actual record sections from the entire reflection program are included. A single type of electrical wireline was chosen to perform all the required down-hole wireline functions. An investigation of the reserved strength at given depths was made of the various type cables, and comparisons of 'wire rope' with the selected logging cable were made.
PB-175 042 HC$3.00 MF$0.65

REFLECTION AND VELOCITY PROFILES AT THE OUTER RIDGE, PUERTO RICO.
Project MOHOLE scientific and technical progress rept. for 31 Mar 64,
Western Geophysical Co. of America, Los Angeles, Calif.
C. H. Savit, W. A. Knox, and D. M. Blue. 13 Nov 63, 19p
Contract NSF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex., subcontract 62-06. Previously announced as PB-167 141. Pub. in Journal of Geophysical Research v69 n4 p701-19 Feb 15 1964. Revision of manuscript submitted 19 Aug 63.

Descriptors: (*Well logging, Feasibility studies), (*Seismology, Geophysical prospecting), (*Marine geology, Caribbean Sea), Marine geophysics, Puerto Rico, Graphics, Site selection.
Identifiers: Mohole project.

Reflection profiling using the long-array technique of exploration seismology together with reflection velocity surveys discloses an intricate fine structure in the large amounts (up to 1.5 sec) of sediments that overlie a 'basement' surface delineated by previous reflection techniques at the outer ridge. A rough surface underlies the deeper, stratified sediments, whereas a smooth surface separates them from overlying, low-velocity (1.7 km/sec), more homogeneous sediments. Neither homogeneous nor stratified sediments are necessarily concordant with the ocean-bottom configuration. Previously reported indications of 3.0-km/sec velocities are confirmed for the deeper stratified sediments. (Author)
PB-175 043 HC$3.00 MF$0.65

PROJECT MOHOLE, NAVAL ARCHITECTURE, MARINE ENGINEERING AND INSTRUMENTATION SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING MARCH 15, 1964.
Brown and Root, Inc., Houston, Tex.
31 Mar 64, 19p
Contract NSF-C-260
Summary identified as PB-175 038.

Descriptors: (*Well logging, Feasibility studies), Contracts, Specifications, Hydrodynamics, Model tests, Hydrostatics, Structural properties, Marine engineering, Ship hulls, Design, Floats, Propellers (Marine), Marine propulsion, Power, Communication systems, Navigation, Instrumentation.
Identifiers: Mohole project, Drilling vessels.

Contents: Contract plans and specifications; Regulatory agencies; Hydrodynamics and model tests; Hydrostatics; Structural design; Structural analysis; Arrangement; Machinery and hull; Power generation; Positioning units; Positioning system; Supply vessel; Vessel auxiliaries instrumentation; Communications and navigation.
PB-175 044 HC$3.00 MF$0.65

EVALUATION OF POWER GENERATION EQUIPMENT PROPOSALS.
Progress rept. no. 2, 24 Feb-6 Mar 64.
Gibbs and Cox, Inc., New York.
Mar 64, 59p
Contract NSF-C-260
See also PB-175 041, summary.

Descriptors: (*Well logging, Feasibility studies), (*Power equipment, *Generators), Electric motors, Electric power production, Electrical equipment, Propulsion, Positioning devices (Machinery), Drilling machines, Diesel engines, Steam turbines, Gas turbines, Direct current.
Identifiers: Mohole project.

Various types of propulsion equipment were studied for positioning and main propulsion service. It was concluded that since the propulsion loads for positioning would be variable and the loads for main propulsion intermittent, the advantages of direct current equipment should be used. Since a large amount of DC traction equipment was already required for drilling service it was logical to use the same type of equipment for propulsion and thus provide additional flexibility and standby capability.
PB-175 045 HC$3.00 MF$0.65

MOHOLE PLATFORM: COEFFICIENT OF THE EQUATIONS OF MOTION (LIGHT DRAFT CASE).
Technical information series,
General Electric Co., Philadelphia, Pa. Missile and Space Div.
A. R. Crocker, W. H. Harker, R. J. Maier, K. E. Steinhauer, and J. L. Mulligan. 15 Dec 63, 97p
R64-ELS-8
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ships, Equations of motion), Ship hulls, Fluid dynamic properties, Floats, Drilling machines, Ocean waves, Cylindrical bodies, Potential theory.
Identifiers: Mohole project, Drilling vessels.

The method used to derive the coefficients had good success in predicting the motion of surface ships according to Korvin-Kroukovsky. There are, however, a few differences which should be noted in applying this to the platform. The first is the existence of the two hulls, which mutually interfere. Secondly is the effect of speed of advance on the wave drag which is not really taken into account. The third, and probably the greatest difference, is the fact that the hulls are not floating at their mid-plane but have a water line 11 feet above this mid-plane. This caused a substantial change in the wave drag and in the driving forces on the platform. However, the mathematics involved makes this a difficult problem to solve. An interesting side effect of Korvin-Kroukovsky's method of using Ursell's k sub 4 factor is that this produces an apparent shift in resonance frequency; that is, the resonance frequency of the platform is a function of the oscillating frequency. (Author)
PB-175 046 HC$3.00 MF$0.65

PRELIMINARY DESIGN CONCEPTS FOR POSITIONING UNITS, MOHOLE DRILLING VESSEL.
Western Gear Corp., Lynwood, Calif. Systems Management Div.
Mar 64, 85p Rept. no. 46139-1000
Contract NSF-C-260
See also PB-175 038, summary.

Descriptors: (*Well logging, Feasibility studies), (*Propellers (Marine), Design), Steering, Marine propulsion, Floats, Drilling machines, Control systems, Ship hulls.
Identifiers: Mohole project, Drilling vessels.

The purpose of the report is to summarize the results of the preliminary studies concerning the design, installation and operation of the Positioning Units for the Mohole Drilling Vessel. The report discusses the overall concept and describes the preliminary designs in some detail. The basic parameters which have been used as guidelines for the study are recorded for reference.
PB-175 047 HC$3.00 MF$0.65

PROJECT MOHOLE: PRELIMINARY STUDY OF MOHOLE VESSEL POSITIONING SYSTEM PERFORMANCE.
Engineering rept.,
Honeywell, West Covina, Calif. California Ordnance Center.
R. Tucker. 27 Jan 64, 42p MH-6145-005
Contract NSF-C-260
See also PB-175 041, summary.

Descriptors: (*Well logging, Feasibility studies), (*Propellers (Marine), Performance (Engineering)), Ocean waves, Wind, Floats, Drilling machines, Steering, Marine propulsion, Thrust, Damping.
Identifiers: Mohole project, Drilling vessels.

The drift characteristics of the vehicle are presented for various combinations of wind and water currents. It is shown that extremely high drift rates are incurred for water currents normal to the vessel longitudinal axis. Curves are given for various combinations of wind and water currents and thrust configurations. Figures were computed for extended periods of time to show the damping characteristics of the vessel. Generally these curves show that the vessel equilibrium distance increases as the angle between the water current and vessel longitudinal axis increases and becomes unstable for water currents of 5.1 ft/sec at an angle of 90 degrees. It is shown that in all cases the equilibrium distance is less when the thrust is a function of vessel heading. (Author)
PB-175 048 HC$3.00 MF$0.65

PROJECT MOHOLE: MOHOLE VESSEL POSITIONING SYSTEM ALARMS.
Honeywell, West Covina, Calif. California Ordnance Center.
1964, 12p
Contract NSF-C-260
See also PB-175 041, summary.

Descriptors: (*Well logging, Feasibility studies), (*Propellers (Marine), *Warning systems), Control systems, Monitors, Floats, Computers, Buoys, Electrical equipment.
Identifiers: Mohole project, Drilling vessels.

Operation of the Mohole vessel positioning equipment involves monitoring and/or actuating various control devices at several different locations aboard the vessel. In order to assist personnel in the correct operation of this equipment under all conditions a system of alarms has been included in the basic equipment design. The document contains a brief description of these alarms as planned, with particular emphasis on alarms available to the pilot. In order to substantiate the need for some of the alarms, a review was made of anticipated operating procedures. Suggested actions to be taken by operating personnel as the result of alarm indications are included in the description. (Author)
PB-175 049 HC$3.00 MF$0.65

PLATFORM ELECTRONICS FOR A SHORT BASELINE ACOUSTIC POSITION MEASUREMENT SYSTEM.
Project MOHOLE scientific and technical progress for the period ending 15 Mar 64.
GM Defense Research Labs., Santa Barba, Calif.
1964, 62p
Contract NSF-C-260
See also PB-175 041, summary.

Descriptors: (*Well logging, Feasibility studies), (*Position finding, *Hydrophones), Underwater sound, Electronic equipment, Floats, Drilling machines, Ships.
Identifiers: Mohole project, Drilling vessels.

The interim report was prepared to consolidate the detail design of platform electronics for a short baseline acoustic position measurement system. The design is suitable for use with a variety of insitu geometries using either passive reflectors, transponders or ocean floor arrays. The platform electronics complement divides into four general areas; that of signal generation and reception, signal processing, range computation and coordinate generation. The first two areas make use of analog circuitry, i.e., amplifiers, filters, etc., whereas the latter two areas are composed primarily of digital equipment. The discussion treats each area individually, prefaced by a general system description and followed by the equipment installation requirements. (Author)
PB-175 050 HC$3.00 MF$0.65

PROJECT MOHOLE: ALTERNATE VESSEL POSITIONING SYSTEM.
Monthly progress rept.,
GM Defense Research Labs., Santa Barbara, Calif.
T. Baker. 31 Jan 64, 24p
Contract NSF-C-260
See also PB-175 041, summary.

Descriptors: (*Well logging, Feasibility studies), (*Propellers (Marine), Design), Ships, Marine propulsion, Steering, Drilling machines, Floats, Radar equipment, Reliability.
Identifiers: Mohole project, Drilling vessels.

A discussion is given of major activities in the following areas: Short baseline platform positioning studies; modulated radar devices; drill hole reentry system; reliability.
PB-175 051 HC$3.00 MF$0.65

PROJECT MOHOLE, DRILLING SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING MARCH 15, 1964.
Brown and Root, Inc., Houston, Tex.
31 Mar 64, 116p
Contract NSF-C-260
See also PB-175 064.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Structures, Drilling, Hoists, Couplings, Positioning devices (Machinery), Pipes, Buoys, Supports, Cutting fluids, Underwater equipment, Instrumentation, Drills, Performance (Engineering).
Identifiers: Mohole project.

Contents: Derrick and substructure; Hoisting equipment; Rotating equipment; Pipe handling; Drill pipe; Riser system (buoys, activation systems, casing, landing base); Mud system (drilling fluid friction reducer); Re-entry systems; Drilling instrumentation (turbodrill instrument package, down-hole orientation, recording spectroscopic analysis); Down-hold drills (coring turbodrill, drill collars, retractable diamond bits, wireline coring electrodrill); Equipment evaluation drilling program; Initial operation procedures.
PB-175 052 HC$3.00 MF$0.65

EFFECTS OF MUD WEIGHT ON RISER CASING BURST.
Project MOHOLE scientific and technical progress for the period ending 31 Mar 64.
Brown and Root, Inc., Houston, Tex.
1964, 23p
Contract NSF-C-260
Supersedes PB-167 142 and PB-167 147. See also PB-175 041, summary.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Rupture), (*Seals, Pipes), Weight, Cutting fluids, Tests, Drilling machines, Graphics, Rotation, Wear resistance, Deflection, Performance (Engineering).
Identifiers: Mohole project, Casing.

Six curves are presented showing the effect of mud weight vs depth with regard to burst with a safety factor of 1, 1.5 and 2 on each weight of pipe. The curves are based on static calculations with no allowances made for the effects of bending current profile, temperature, corrosion, etc. The effect of collapse is based on the collapse rating of the pipe with 40,000 psi axial tension stress. A series of tests were made producing valuable information about swivel parts as well as about the washpipe and packing assemblies. At high circulating pressure (5000 psi) the deflection of the swivel parts (bonnet) that contains the washpipe assembly is extremely critical. This indicates that for the final swivel, the bonnet must be designed to prevent deflection as well as withstand the high pressure. Also, the alignment of the stem must be accurate because at high pressure, the float of the washpipe is decreased or eliminated. The tests produced one conclusion with respect to wear of the packing rings. On all sets of packing tested, the most wear occurred at the heel of the packing rings.
PB-175 053 HC$3.00 MF$0.65

A STUDY OF FATIGUE AND OTHER RELATED PROBLEMS ASSOCIATED WITH DRILL PIPE AND CASING MATERIALS FOR PROJECT MOHOLE.
Summary rept.,
Battelle Memorial Inst., Columbus, Ohio.
Arnold E. Schuetz, Walter S. Hyler, Lloyd R. Jackson, and Walter K. Boyd. 28 Feb 64, 49p
Contract NSF-C-260
See also PB-175 041 summary. Prepared on subcontract to Brown and Root, Inc., Houston, Tex.

Descriptors: (*Well logging, Feasibility studies), (*Fatigue (Mechanics), *Pipes), Drills, Steel, Environmental tests, Pressure, Corrosion, Sea water, Fracture (Mechanics), Sensitivity, Toughness.
Identifiers: Mohole project.

The results of a preliminary study to evaluate materials for the drill string to be used in Project Mohole are presented in this report. Most of the evaluation was made on high-strength S-135 heat-treated drill pipe; but some comparative testing also was made on the more common Grade E steel pipe. Studies were carried out concerned with fatigue strength in air, corrosion fatigue in sea water, stress-corrosion cracking at high temperature and pressure, and with impact strength. The fatigue strength of S-135 steel was generally higher than that of Grade E steel; however, with the higher notch sensitivity of the S-135 steel, its notched alternating stress limit was the same as that for the Grade E steel. As expected, fatigue strengths of the steels were reduced in the sea water environment. Thus, a critical problem exists in controlling corrosion fatigue of the drill string. Fortunately, no susceptibility to stress-corrosion cracking in sea water at 2200-psi pressure at 650F was found for either steel. Impact strength of the S-135 steel appears to be marginal and to require improvement. Possibilities of combating the two critical conditions--corrosion fatigue and fracture toughness--are discussed. (Author)
PB-175 054 HC$3.00 MF$0.65

PROJECT MOHOLE: SUBCONTRACTS SECTION.
Summary rept.
Brown and Root, Inc., Houston, Tex.
31 Mar 64, 23p
Contract NSF-C-260
See also PB-175 041, summary.

Descriptors: (*Well logging, Feasibility studies), Contracts, Scheduling, Research program administration, Costs, Design, Procurement.
Identifiers: Mohole project.

Summary reports of subcontracts are listed along with a computer printout of the project schedule dated March, 1964.
PB-175 055 HC$3.00 MF$0.65

PROJECT MOHOLE, SUMMARY AND SCIENCE SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING APRIL 15, 1964.
Brown and Root, Inc., Houston, Tex.
30 Apr 64, 24p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Specifications), Measurement, Instrumentation, Magnetometers, Conductivity, Thermal properties, Corrosion, Fatigue (Mechanics).
Identifiers: Mohole project.

The logging winch Stage A design was completed. Specifications and a work statement for the design of a bore-hole logging magnetometer were prepared and are included within the report. In regard to formation density measurements, a review was made of the available logging instruments applicable to the Mohole program and particular emphasis has been given to acoustic velocity and gamma-gamma logging instruments. Two conceptual designs for derrick and substructure were completed by the staff; the statement of work and the request for proposal for detail design and construction of these items has been completed. The research work being conducted at Battelle continues in devising a method which would accelerate corrosion fatigue tests. (Author)
PB-175 056 HC$3.00 MF$0.65

PROJECT MOHOLE: SITE SURVEYS - PUERTO RICO AREA.
Final rept.
Western Geophysical Co. of America, Los Angeles, Calif.
Mar 64, 76p
Contract NSF-C-260
Supersedes PB-167 146. Prepared on subcontract to Brown and Root, Inc., Houston, Tex., subcontract 62-06.

Descriptors: (*Well logging, Feasibility studies), (*Seismology, *Stratigraphy), Reflection, Ocean bottom sampling, Sedimentary rock, Thickness, Sedimentation, Terrain, Refraction, Velocity, Oceans, Equations, Sea water, Tables, Maps, Puerto Rico.
Identifiers: Mohole project.

Western Geophysical Company conducted a seismic survey of the Outer Ridge and Barracuda Fault areas during February and March 1963 to produce 1156 km of reflection and refraction coverage. Results of the reflection survey were excellent, yielding a clear and detailed picture of the entire sedimentary column above the basement. Using data from six velocity profiles, the thicknesses of the individual sedimentary layers were readily computed. Overall sediment thickness ranged from virtually zero to 3 km. Refracted arrivals were obtained from the top of the basement, or Layer 2 (4.3 km/sec), from the top of the oceanic crust (6.3 km/sec), and from the top of the mantle (8.3 km/sec), although all three velocities did not always appear on each profile. At several locations in both survey areas, mantle is found shallower than 9.0 km below sea level. Both reflection and refraction data indicate that sub-bottom structure is more complicated than has generally been assumed, that basement configuration is uneven, and that fault structures displace both the oceanic crust and the mantle. Topographic trends at Outer Ridge do not necessarily coincide with subsurface structural trends; the topographic high strikes ESE, whereas the mantle high strikes ENE. At Barracuda Fault, topographic and subsurface features are coincident. (Author)
PB-175 057 HC$3.00 MF$0.65

DESIGN PROPOSAL OF SURFACE AUXILIARY LOGGING EQUIPMENT, PHASE II.
Project MOHOLE scientific and technical progress rept. for 15 Apr 64.
Schlumberger Well Surveying Corp., Houston, Tex.
1 Apr 64, 33p
Contract NSF-C-260
Previously announced as PB-167 140.

Descriptors: (*Well logging, Feasibility studies), (*Design, Well logging), Machine tools, Electric cables, Drills, Performance (Engineering), Drilling machines, Joints, Instrumentation, Electric motors, Circuits, Mechanical drawings.
Identifiers: Mohole project.

The Surface auxiliary logging equipment is designed to perform many functions during Phase II of Project Mohole. The main functions of the logging unit are: logging services, coring, and turbodrill monitoring. (Author)
PB-175 058 HC$3.00 MF$0.65

PROJECT MOHOLE, NAVAL ARCHITECTURE, MARINE ENGINEERING AND INSTRUMENTATION SECTION.
Scientific and technical progress for the period ending 15 Apr 64.
Brown and Root, Inc., Houston, Tex.
1964, 30p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Specifications, Hydrodynamics, Model tests, Hydrostatics, Structural properties, Marine engineering, Ship hulls, Design, Floats, Propellers (Marine), Marine propulsion, Power, Instrumentation.
Identifiers: Mohole project, Drilling vessels.

Contents: Contract plans and specifications; Hydrodynamics and model tests; Hydrostatics; Structural design; Structural analysis; Owner furnished equipment; Arrangement; Manning requirements; Machinery and hull systems; Supply vessel; Vessel positioning system; Vessel auxiliaries instrumentation; Power generation.
PB-175 059 HC$3.00 MF$0.65

PROJECT MOHOLE: PROGRESS REPORTS 3, 4, AND 5, FOR THE PERIOD MARCH 9-APRIL 17, 1964.
Gibbs and Cox, Inc., New York.
1964, 103p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ships, Maneuverability), Stability, Control, Floats, Drilling machines, Model tests, Shrouded propellers.
Identifiers: Mohole project, Drilling vessels.

Free-running tests of a 1/45-scale model were conducted to evaluate the directional stability and controllability of the MOHOLE platform at in-transit condition in calm water. Three types of tests were conducted: (1) spiral tests to determine directional stability, (2) zigzag tests to determine relative controllability and overshoot angles, and (3) random steering tests in which an attempt was made to steer the model on a straight course down the basin. All of the tests were run close to the light displacement (26-foot draft) and most were run at even keel, although one run was made at a trim by stern for comparison. All dimensions and data are for full scale unless specified otherwise. The model was equipped with a pair of shrouded propellers. The propellers were drawn from stock and each had a diameter corresponding to about 16.3 feet. Each shroud, or nozzle, had a chord corresponding to about 8.5 feet and was supported on a tailcone by two large vertical flat plate fins, and two small horizontal struts. (Author)
PB-175 060 HC$3.00 MF$0.65

BREAKDOWN OF DRILLING PLATFORM COMPLEMENT BY CLASSIFICATION WITHIN EACH DEPARTMENT.
Project MOHOLE scientific and technical progress for the period ending 16 Apr 64.
Brown and Root, Inc., Houston, Tex.
1964, 10p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Personnel, Job analysis), Personnel management, Management planning, Kitchens, Scheduling.
Identifiers: Mohole project.

Personnel requirements are given for the deck department, engine department, steward's department, staff (medical), staff (purser), drilling department, scientific department, NSF personnel, visitors, and spares. Hours worked by each category of personnel aboard drilling platform are listed. Meal periods of each category of personnel aboard drilling platform and mess and dining room capacities are presented.
PB-175 061 HC$3.00 MF$0.65

RESISTANCE TEST RESULTS OF A 1/24 SCALE MODEL OF A 200 FOOT SUPPLY SHIP FOR PROJECT MOHOLE.
Michigan Univ., Ann Arbor. Coll. of Engineering.
J. C. Couch. Jan 64, 21p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Drag), Model tests, Ships, Wake, Propellers (Marine), Ocean waves, Hydrodynamics, Drilling machines, Floats, Reliability, Marine propulsion.
Identifiers: Mohole project, Drilling vessels.

Test program was conducted to (1) Perform resistance tests at two drafts and determine effective horsepower requirements; (2) conduct visual flow studies to check the water flow into the propeller areas; (3) photograph wave profiles at different speeds; (4) estimate wake and thrust deduction. (Author)
PB-175 062 HC$3.00 MF$0.65

INITIAL BUOY TEST RESULTS.
Project MOHOLE scientific and technical progress rept. for 15 Apr 64,
Brown and Root, Inc., Houston, Tex.
William Allen, Jr. 3 Mar 64, 11p
Contract NSF-C-260
Previously announced as PB-167 137.

Descriptors: (*Well logging, Feasibility studies), (*Buoys, Tests), Drag, Floats, Velocity, Towed bodies, Ballast.
Identifiers: Mohole project.

The initial portion of the buoy test program consisted of two test phases: surface float drag tests, and experimental test plant. Results of the drag tests indicate that the drag of the surface float is higher than indicated by the manufacturer by a factor of more than 2. Cause may be attributed to the chain ballast. The experimental test plant was successful in that satisfactory handling procedures evolved from the work. Unfortunately, the entire buoy assembly was lost during the night due to unknown causes. (Author)
PB-175 063 HC$3.00 MF$0.65

PROJECT MOHOLE DRILLING SECTION.
Scientific and technical progress for the period ending 15 Apr 64.
Brown and Root, Inc., Houston, Tex.
1964, 28p
Contract NSF-C-260
See also PB-175 077.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Structures, Drilling, Pipes, Supports, Drills, Performance (Engineering).
Identifiers: Mohole project.

Contents: Derrick and substructure; Pipe handling; Drill pipe; Riser support system; Down hole drills; Equipment evaluation well drilling.
PB-175 064 HC$3.00 MF$0.65

TESTING SYNTACTIC FOAM BUOYANCY MATERIALS.
Progress rept. no. 1, 26 Feb-31 Mar 64.
General Motors Corp., Dayton, Ohio. Inland Mfg. Div.
1964, 19p
Contract NSF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex., subcontract 63-45. See also PB-175 080.

Descriptors: (*Well logging, Feasibility studies), (*Buoys, *Foams), (*Expanded plastics, Buoys), Buoyancy, Compressive properties, Absorption (Physical), Hydrostatic tests, Impact tests, Water, Antifouling coatings, Epoxy plastics, Glass, Phenolic plastics, Composite materials, Deep water.
Identifiers: Mohole project.

Three blocks of new syntactic foam materials were cast. The data gathered on these castings was compared to typical physical properties of Inlyte 66. Based on numerous test results, Inlyte 66 is the best syntactic foam candidate for the primary task at this time. Development work on the Izod Point Impact test is nearly completed. An insert was designed for the Izod impact machine, which tapers to a 1/16 inch radius. Utilizing calibrated weights on the swing arm they can determine the energy required to just penetrate coating materials of various thicknesses. Hydrostatic tests conducted on two coated specimens whose coatings had been pierced five and twelve times respectively, showed that water absorption is directly proportional to the number of punctures. In order to establish the merit of a coating material, a cirterion as to the number of punctures that it is subjected to before hydrostatic testing, must be settled upon.
PB-175 065 HC$3.00 MF$0.65

PLANS FOR INITIAL CORROSION FATIGUE CONTROL AND HYDROGEN CRACKING TESTS.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 64.
Hughes Tool Co., Culver City, Calif.
1964, 92p
Contract NSF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex.

Descriptors: (*Well logging, Feasibility studies), (*Corrosion inhibition, *Pipes), Hydrogen embrittlement, Fatigue (Mechanics), Metal coatings, Thickness, Steel, Photomicrography, Cracks, Fracture (Mechanics), Sea water, Impact tests, Drilling machines, Toughness, Environmental tests, Tables, Stresses.
Identifiers: Mohole project.

The report contains plans to control corrosion fatigue and to determine if hydrogen will be a problem with high-strength drill pipe and casing. (Author)
PB-175 066 HC$3.00 MF$0.65

EVALUATION OF DRILL PIPE FOR MOHOLE PROJECT.
Scientific and technical progress rept. for 15 Apr 64.
Reed Roller Bit Co., Houston, Tex.
15 Apr 64, 51p
Contract NSF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex. Previously announced as PB-167 139.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Hardness, Physical properties, Impact tests, Failure (Mechanics), Loading (Mechanics), Metallography.
Identifiers: Mohole project.

Physical properties and hardness values for the drill pipe tested were in line with those expected for this grade of pipe, and indicated good response to heat treatment for the chemical compositions used. C-Ring and notched bend tests gave results believed to be representative of material of this hardness level. Longitudinal hardness surveys through the flashweld area and upset zone are typical for the grades of material used. Rotary fatigue tests pipe failures originated on the outside of the pipe in all but two instances. The two instances of inside failure origination were on different lengths of pipe from the same vendor. In all cases of outside failure, crack initiation occurred in longitudinal grinding marks existing in the pipe when received for testing. No failures have originated in the wrinkles found in the upset area of the pipe. All pipe failures occurred within a maximum distance of 4 inches from the base of the upset. This rather localized area of failure may be the result of the relatively steep bending moment gradient created by the necessarily short moment arm of 70 inches. Conceivably, under service conditions, failures would occur over a greater pipe length. (Author)
PB-175 067 HC$3.00 MF$0.65

INSPECTION OF GRADE S-135 DRILL PIPE TEST SAMPLES.
Project MOHOLE scientific and technical progress rept. for 15 Apr 64,
AMF Tuboscope, Inc., Houston, Tex.
H. J. Schneider, F. M. Wood, and W. M. Rogers.
7 Apr 64, 19p
Contract NSF-C-260
Previously announced as PB-167 130.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Steel), Drilling, Defects (Materials), Fracture (Mechanics), Microstructure, Couplings, Failure (Mechanics), Tests.
Identifiers: Mohole project, Drill pipes.

Contents: Discussion; Procedure; Inspection results - initial inspection (standard AMALOG and special end area inspection) (electronic end area inspection of new drill pipe after attachment of tool joints) (ISOLOG B and ultrasonic inspection); Inspection results - final inspection (AMALOG, SONOSCOPE, electronic end area and magnetic particle inspection).
PB-175 068 HC$3.00 MF$0.65

EQUIPMENT EVALUATION WELL DRILLING PROGRAM.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 64.
Brown and Root, Inc., Houston, Tex.
1964, 27p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Experimental design), Drills, Pipes, Cutting fluids, Tests, Performance (Engineering), Diamonds.
Identifiers: Mohole project.

The report describes a 'first time' series of tests to be conducted on some critical items of downhole tools and other equipment. The equipment items scheduled for test and evaluation are as follows: coring turbodrill, conventional core barrel, wire line conventional core barrel, mechanical mud treating equipment, mud and chemical tests, logging instruments, auxilliary equipment items.
PB-175 069 HC$3.00 MF$0.65

PROJECT MOHOLE, SCHEDULING SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING APRIL 15, 1964.
Brown and Root, Inc., Houston, Tex.
1964, 16p
Contract NSF-C-260
See also PB-175 027 and PB-175 129.

Descriptors: (*Well logging, Feasibility studies), (*Scheduling, Research program administration), Management engineering, Diagrams.
Identifiers: Mohole project.

The report presents a computer printout with activities arranged in early start sequence. It also includes a basic CPM activity network.
PB-175 070 HC$3.00 MF$0.65

PROJECT MOHOLE, SUMMARY AND SCIENCE SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING MAY 15, 1964.
Brown and Root, Inc., Houston, Tex.
31 May 64, 26p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Specifications), Instrumentation, Measurement, Weight, Stability, Drilling machines, Stresses, Design, Pipes, Steel, Nickel, Titanium alloys, Carbon.
Identifiers: Mohole project.

The oceanographic activities during the period covered by this report pertained principally to equipment. The logging and measurement activities of the Science section include a review of the currently available logging instruments applicable to the Mohole program. Rapid progress in the platform design review is made. The feasibility of the design is now verified to a great extent by the analysis of model test data, stress analysis, weight and stability studies, and review of machinery design. Preparation of material for the hull and machinery specifications is also in progress. In regard to the derrick and substructure, a work statement and conceptual design drawings have been prepared for use in a request for proposal for the design and construction of a single 196-ft derrick and substructure which will accommodate either a horizontal or a vertical pipe racking system. In regard to drill pipe investigations, discussions with Battelle personnel regarding their work in the selection of alternative drill pipe materials has resulted in establishing three relatively well known carbon steel alloys (AMS6427, AISI4340M, and D6A) and a high nickel steel and a titanium alloy (Inconel 718 and Ti-6A1-4V) as potential materials for drill pipe. (Author)
PB-175 071 HC$3.00 MF$0.65

PROJECT MOHOLE, NAVAL ARCHITECTURE, MARINE ENGINEERING AND INSTRUMENTATION SECTION.
Scientific and technical progress for the period ending 15 May 64.
Brown and Root, Inc., Houston, Tex.
1964, 43p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Specifications, Hydrodynamics, Model tests, Hydrostatics, Structural properties, Marine engineering, Ship hulls, Design, Floats, Propellers (Marine), Marine propulsion, Power, Communication systems, Navigation, Instrumentation.
Identifiers: Mohole project, Drilling vessels.

Contents: Contract plans and specifications; Hydrodynamics and model tests; Hydrostatics; Structural design; Owner furnished equipment; Arrangement; Structural analysis; Machinery and hull systems; Supply vessel; Positioning units; Vessel positioning system; Power generation; Communication and navigation.
PB-175 072 HC$3.00 MF$0.65

1:100 SCALE PLATFORM MODEL TESTS: MOTIONS AND FORCES IN REGULAR AND IRREGULAR WAVES.
Test description and data rept. for 27 Mar-3 Apr 64.
Stevens Inst. of Tech., Hoboken, N. J.
May 64, 12p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Model tests), Fluid dynamic properties, Ocean waves, Drilling machines, Floats, Motion, Force (Mechanics), Roll, Pitch (Motion), Tables.
Identifiers: Mohole project, Drilling vessels.

The report consists of tabular data of the hydrodynamic properties of platform models.
PB-175 073 HC$3.00 MF$0.65

FLOATING DRILLING PLATFORM. DATA ANALYSIS AND PLOTS.
Project MOHOLE scientific and technical progress for the period ending 15 May 64.
Stevens Inst. of Tech., Hoboken, N. J.

3 Apr 64, 62p
Contract NSF-C-260
Availability: Microfiche only after original copies are exhausted.

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Model tests), Fluid dynamic properties, Ocean waves, Drilling machines, Floats, Pitch (Motion), Roll, Tables, Graphics.
Identifiers: Mohole project, Drilling vessels.

Experimental hydrodynamic data are presented in tabular and graphical form.
PB-175 074 HC$3.00 MF$0.65

FLOATING DRILLING PLATFORM: FORWARDING OF FORCE AND MOTION CORRELATION STUDIES.
Project MOHOLE, scientific and technical progress for the period ending 15 May 64.
Gibbs and Cox, Inc., New York.
18 May 64, 47p
Contract NSF-C-260
Availability: Microfiche only after original copies are exhausted.

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Hydrodynamics), Drilling machines, Floats, Motion, Force (Mechanics), Ocean waves, Tables, Correlation techniques.
Identifiers: Mohole project, Drilling vessels.

Correlations are presented on experimental data produced by Davidson Laboratory and by General Electric Advanced Technology Laboratories.
PB-175 075 HC$3.00 MF$0.65

PLATFORM MODEL TESTING.
Project MOHOLE scientific and technical progress for the period ending 15 May 64.
Stevens Inst. of Tech., Hoboken, N. J. Davidson Lab.
18 May 64, 23p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Model tests), Costs, Stresses, Loading (Mechanics), Drilling machines, Floats, Hydrodynamics, Ship hulls, Stiffened cylinders, Buckling (Mechanics).
Identifiers: Mohole project, Drilling vessels.

The report includes a cost breakdown on the 'Optimum Draft Investigation' and a description of the planned platform stress analysis program. A progress report on the buckling analysis of longitudinally and circumferentially stiffened cylindrical shells, by P. R. Paslay, is appended.
PB-175 076 HC$3.00 MF$0.65

PROJECT MOHOLE, DRILLING SECTION, SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING MAY 15, 1964.
Brown and Root, Inc., Houston, Tex.
30 May 64, 29p
Contract NSF-C-260
See also PB-175 093.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Structures, Drilling, Positioning devices (Machinery), Couplings, Pipes, Seals, Titanium, Corrosion inhibition, Supports, Buoys, Underwater equipment, Instrumentation, Drills, Operators (Personnel).
Identifiers: Mohole project.

Contents: Derrick and substructure; Pipe handling (horizontal pipe racker, shock absorber for rotary table); Rotating equipment (conventional swivel, power sub); Drill pipe (Battelle progress, meeting with pipe manufacturers, titanium, Curtiss-Wright sub-contract, tool joint seals, tubular goods inspection, corrosion control); Riser system; Riser support system (passive buoys, inflatable buoys, buoyancy activation, destruction and control, gas generators, manual diving); Re-entry instrumentation; Down-hole drills (wireline core barrel, coring turbodrill, retractable diamond core bits); Drilling personnel requirements.
PB-175 077 HC$3.00 MF$0.65

RFP NOS. 68, 69, AND 70 DESIGN AND PROCUREMENT OF PROTOTYPE RETRACTABLE DIAMOND CORE BIT HEAD AND BARRELS; DESIGN AND PROCUREMENT OF SWIVELS.
Project MOHOLE scientific and technical progress for the period ending 15 May 64.
Brown and Root, Inc., Houston, Tex.
30 May 64, 55p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drills, Specifications), Diamonds, Structures, Design, Steel, Drilling, Mechanical drawings, Acceleration, Machine tools, Cutting tools, Rotation.
Identifiers: Mohole project.

The research contains the labor, materials, tools, and equipment to design and fabricate a prototype retractable diamond core bit head, mandrel, outer core barrel, and inner core barrel. (Author)
PB-175 078 HC$3.00 MF$0.65

A STUDY OF FATIGUE AND OTHER RELATED PROBLEMS ASSOCIATED WITH DRILL PIPE AND CASING MATERIALS FOR PROJECT MOHOLE.
Scientific and technical progress for the period ending 15 May 64.
Battelle Memorian Inst., Columbus, Ohio.
30 May 64, 19p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Steel, Cathodic protection, Titanium alloys, Nickel alloys, Impact tests.
Identifiers: Mohole project, Drill pipes, Casing.

Progress is reported on a study of fatigue and other related problems associated with drill pipe and casing materials for Project Mohole.
PB-175 079 HC$3.00 MF$0.65

TESTING SYNTACTIC FOAM BUOYANCY MATERIALS. PROGRESS REPORT NO. 2.
Project MOHOLE scientific and technical progress for the period ending 15 May 64.
General Motors Corp., Dayton, Ohio. Inland Manufacturing Div.
31 May 64, 25p
Contract NSF-C-260
Prepared in cooperation with Brown and Root, Inc., Houston, Tex. under subcontract 63-45. See also PB-175 098.

Descriptors: (*Well logging, Feasibility studies), (*Buoys, *Foams), (*Expanded plastics, Buoys), Antifouling coatings, Impact tests, Diving, Training, Epoxy plastics, Glass, Phenolic plastics, Composite materials, Buoyancy, Deep water.
Identifiers: Mohole project.

The preliminary evaluation of new syntactic foam compounds has continued with most of our efforts directed toward reducing the cost of syntactic foam materials for deep water. Development work on the Izod point impact test has been completed and a tentative procedure for conducting the testing has been established. Promising coating material has been successfully applied to a syntactic foam substrate by spraying. This coating had previously been brush-applied.
PB-175 080 HC$3.00 MF$0.65

SUBCONTRACTS AND SCHEDULING SECTIONS.
Project MOHOLE scientific and technical progress for the period ending 15 May 64.
Brown and Root, Inc., Houston, Tex.
31 May 64, 25p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Scheduling, Research program administration, Costs, Design, Procurement.
Identifiers: Mohole project.

Summary reports of subcontracts are listed along with a computer printout of the project schedule dated May, 1964.
PB-175 081 HC$3.00 MF$0.65

PROJECT MOHOLE: SCIENTIFIC AND TECHNICAL PROGRESS REPORT FOR THE PERIOD ENDING JUNE 30, 1964.
Summary rept.
Brown and Root, Inc., Houston, Tex.
30 Jun 64, 16p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Specifications), Pipes, Fatigue (Mechanics), Efficiency, Stresses, Electric cables, Structures, Design, Electric motors, Calibration, Electric propulsion, Drilling machines, Mechanical properties, Quality control, Steel, Instrumentation, Cutting fluids.
Identifiers: Mohole project.

The main Propulsion Motors continue to be the subject of intensive study; a single 7,500-hp direct-drive d-c motor has now been proposed for the propulsion system, replacing the original 8-motor geared arrangement. This represents a 50 percent increase in power over the original system. Also, as an alternate to this, General Electric has proposed a system of five 1,500-hp motors driving through a reduction gear. The latter system has the advantages of lower weight and less cost but the disadvantage of greater complexity. The work accomplished under Machinery and Hull Systems during the past period includes the preparation of piping diagrams for compressed air, fresh drilling water, potable water, fuel oil, jet fuel, fire and wash-down water, lube oil, and ventilation. The research on Drill Pipe continues primarily at the facilities of Battelle Memorial Institute. During the past month an interesting anomaly was observed that resulted from fatigue tests on four homogenous joints of drill pipe. One of the specimens appeared to behave differently in fatigue; mechanical and spectrographic analysis failed to uncover reasons for this behavior. It was therefore concluded that considerable variation in fatigue properties can be expected in drill pipe manufactured from the same heat of steel. This observed anomaly emphasizes the necessity for close quality control at the mill. Other factors indicated by the Battelle work show the important influence of the corrosive environment in fatigue life of the S-135 drill pipe material. (Author)
PB-175 082 HC$3.00 MF$0.65

NAVAL ARCHITECTURE, MARINE ENGINEERING, AND INSTRUMENTATION SECTION.
Project MOHOLE scientific and technical progress rept. for 15 Jun 64.
Brown and Root, Inc., Houston, Tex.
15 Jun 64, 23p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Specifications, Hydrodynamics, Model tests, Hydrostatics, Structural properties, Marine engineering, Ship hulls, Design, Floats, Propellers (Marine), Marine propulsion, Communication systems, Navigation, Instrumentation.
Identifiers: Mohole project, Drilling vessels.

Contents: Contract plans and specifications; Hydrodynamics and model tests; Hydrostatics; Structural design; Arrangement; Structural analysis; Machinery and hull systems; Positioning units; Vessel positioning system; Communications and navigation.
PB-175 083 HC$3.00 MF$0.65

PROJECT MOHOLE: PROGRESS REPORT NOS. 8 AND 9.
Scientific and technical progress rept. for 15 Jun 64.
Brown and Root, Inc., Houston, Tex.
15 Jun 64, 8p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Ship hulls, Floats, Drilling machines, Electrical equipment, Propellers (Marine), Model tests.
Identifiers: Mohole project.

A report is presented on progress made during the period May 15, 1964 - June 12, 1964 on the hull, machinery, and electrical equipment.
PB-175 084 HC$3.00 MF$0.65

PRELIMINARY REPORT OF THE SEAWORTHINESS CHARACTERISTICS OF THE MOHOLE PLATFORM, PART I.
Scientific and technical progress rept. for 15 Jun 64.
Brown and Root, Inc., Houston, Tex.
15 Jun 64, 20p
Contract NSF-C-260
Research supported in part by DTMB. See also PB-175 086.

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Model tests), Fluid dynamic properties, Ocean waves, Drilling machines, Floats, Pitch (Motion), Roll, Acceleration.
Identifiers: Mohole project, Drilling vessels, Seaworthiness.

Tests on a seaworthiness model of the MOHOLE Drilling Platform were conducted in regular and irregular waves at zero speed. Tests were conducted at drafts of 70, 50, and 26 feet corresponding to full scale displacements of 22,885, 19,690, and 14,350 long tons respectively. In order to obtain dynamic similitude for the 26 and 70-ft drafts, the ballast weights were properly positioned so that the vertical center of gravity and the natural periods were simulated as closely as possible. For the 50-ft draft these values were estimated. The measured natural heave, pitch, and roll periods of the model at the three drafts are shown. Wave lengths varied from about .7 to 6.7 times the model length in the regular wave tests. Tests were also made in programmed waves simulating Sea States 5 through 7. Measurements of pitch angle, roll angle, heave acceleration, wave height, surge acceleration, sway acceleration, and yaw angle were made. (Author)
PB-175 085 HC$3.00 MF$0.65

PRELIMINARY REPORT OF THE SEAWORTHINESS CHARACTERISTICS OF THE MOHOLE PLATFORM, PART II.
Project MOHOLE scientific and technical progress rept. for 15 Jun 64.
Brown and Root, Inc., Houston, Tex.
15 Jun 64, 30p
Contract NSF-C-260
Research supported in part by DTMB. See also PB-175 085.

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Model tests), Fluid dynamic properties, Ocean waves, Drilling machines, Floats, Corrections, Pitch (Motion), Roll, Ballast, Tables.
Identifiers: Mohole project, Drilling vessels, Seaworthiness.

An outline is given of the procedure for deriving correction factors for motion amplitudes. Correction factors and model condition calculations are tabulated. Hydrodynamic characteristics are described.
PB-175 086 HC$3.00 MF$0.65

INFORMATION PERTAINING TO THE MOTION PICTURES OF THE SEAWORTHINESS TESTS OF THE MOHOLE PLATFORM.
Scientific and technical progress rept. for 15 Jun 64.
Brown and Root, Inc., Houston, Tex.
15 Jun 64, 20p
Contract NSF-C-260
Research supported in part by DTMB.

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Model tests), Motion pictures, Fluid dynamic properties, Drilling machines, Floats, Ocean waves.
Identifiers: Mohole project, Drilling vessels, Seaworthiness.

Two 16mm Mitchell movie cameras were used to obtain motion pictures for almost every test run. Camera Number 1, mounted in a fixed position, was equipped with a grid in front of its lens to aid in visually estimating the model motions. Camera Number 2 was mounted so that it could rotate about the vertical and horizontal axes. Thus this camera could follow the model as it changed its position relative to the carriage. The movies were made at a speed of 108 frames per second so that when they are projected at a speed of 16 frames per second, the motions will occur at prototype frequency. This high film speed limited the time that the cameras could be operated during any one test. Consequently tests in a particular sea state as recorded photographically may not be truly representative of the motions for that sea condition since the sampling was necessarily limited. A list showing the run number, draft, heading, wave height, wave length (or sea state), as well as brief remarks concerning the movies is presented. The movies are spliced in the following order: (1) grid camera, (2) title, (3) moving camera. (Author)
PB-175 087 HC$3.00 MF$0.65

1:100 SCALE PLATFORM MODEL TESTS. TABLES II, III, AND IV., REVISED JUNE 12, 1964.
Project MOHOLE scientific and technical progress rept. for 15 Jun 64.
Stevens Inst. of Tech., Hoboken, N. J.
15 Jun 64, 52p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Model tests), Fluid dynamic properties, Ocean waves, Drilling machines, Floats, Pitch (Motion), Roll, Tables.
Identifiers: Mohole project, Drilling vessels.

Experimental hydrodynamic data are presented in tabular form.
PB-175 088 HC$3.00 MF$0.65

PROJECT MOHOLE: SHIP'S COMPLEMENT AND BERTHING SCHEDULE.
Scientific and technical progress rept. for 15 Jun 64.
Brown and Root, Inc., Houston, Tex.
15 Jun 64, 6p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Personnel, Scheduling), Personnel management, Bedding, Shipborne, Management planning.
Identifiers: Mohole project.

Charts are presented listing berthing accommodations for each classification of personnel.
PB-175 089 HC$3.00 MF$0.65

NATURAL FREQUENCY, MODAL MASS, AND DYNAMIC STRESS STUDIES, SECTIONS 1, 2 AND 3.
Project MOHOLE scientific and technical progress rept. for 15 Jun 64,
Advanced Technology Labs., Schenectady, N. Y.
R. M. Mains. 20 Jan 64, 60p
Contract NSF-C-260
Previously announced as PB-167 119.

Descriptors: (*Well logging, Feasibility studies), (*Ships, Structural properties), Hydrodynamics, Stresses, Loading (Mechanics), Mathematical models, Distortion, Floats, Drilling machines.
Identifiers: Mohole project, Drilling vessels.

Contents: Dimensions; Data sheets; Mathematical model; Normal modes and frequencies; Stress calculation scheme; Symmetry-antisymmetry of loads; Stresses from distortions; Calculations.
PB-175 090 HC$3.00 MF$0.65

DESIGN SEA STATE STUDY.
Project MOHOLE final scientific and technical progress for the period ending 15 Jun 64,
National Engineering Science Co., Washington, D. C.
C. L. Bretschneider, and J. I. Collins. 6 Jun 64, 42p SN-187
Contract NSF-C-260
Previously announced as PB-167 128.
Descriptors: (*Well logging, Feasibility studies), (*Tropical cyclones, Weather forecasting), Marine meteorology, Hurricane tracking, Ocean waves, Surface properties, Oceanology, Atlantic ocean.
Identifiers: Mohole project.

Detailed knowledge of the expected sea state is required for the design and operation of the Mohole drilling platform. One of the requirements is an estimate of the maximum expected sea conditions so that survival of the drilling platform can be assured. The purpose of this study is to predict the maximum sea state for the North Atlantic hurricane belt between the equator and 30 degrees N. latitude. Other areas of the world where this sea state can be equalled or exceeded will be indicated. (Author)
PB-175 091 HC$3.00 MF$0.65

STAGE 'A' - RECOMMENDATIONS VESSEL POSITIONING SYSTEM.
Project MOHOLE scientific and technical progress rept. for 15 Jun 64.
Brown and Root, Inc., Houston, Tex.
15 Jun 64, 30p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Propellers (Marine), Design), Specifications, Mechanical drawings, Ships, Manpower, Marine propulsion, Steering.
Identifiers: Mohole project, Drilling vessels.

Recommended equipment is described. Drawing numbers and titles are listed.
PB-175 092 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress rept. for 15 Jun 64.
Brown and Root, Inc., Houston, Tex.
15 Jun 64, 32p
Contract NSF-C-260
See also PB-175 110.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Structures, Drilling, Hoists, Couplings, Pipes, Supports, Underwater equipment, Instrumentation, Drills, Housing.
Identifiers: Mohole project.

Contents: Derrick and substructure; Hoisting system; Rotating equipment; Drill pipe; Riser system; Riser support system; Down-hole drills; Berthing arrangements.
PB-175 093 HC$3.00 MF$0.65

RFP NO. 71 DESIGN AND PROCUREMENT OF ELECTRIC POWER SUB.
Project MOHOLE scientific and technical progress rept. for 15 Jan 64.
Brown and Root, Inc., Houston, Tex.
15 Jun 64, 5p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Submarines, Specifications), Electric motors, Electric cables, Mechanical drawings, Instruction manuals, Maintenance, Design, Marine engineering, Torque.
Identifiers: Mohole project.

The report contains specifications for development of an electric power sub. (Author)
PB-175 094 HC$3.00 MF$0.65

MONTHLY REPORT FROM BATTELLE MEMORIAL INSTITUTE, SUPPLEMENT NO. 1. MONTHLY REPORT FROM CURTISS-WRIGHT CORP.
Project MOHOLE scientific and technical progress rept. for 15 Jun 64.
Battelle Memorial Inst., Columbus, Ohio.
15 Jun 64, 22p
Contract NSF-C-260
See also PB-175 114.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Steel, Hydrogen embrittlement, Cathodic protection, Corrosion, Stresses, Experimental data, Sea water.
Identifiers: Mohole project, Drill pipes.

Fatigue studies were made on S-135 pipe which involved a number of tests in air, and in sea water. In addition, fatigue work was done in sea water to study cathodic protection.
PB-175 095 HC$3.00 MF$0.65

CORROSION IN DEEP-OCEAN AND RELATED ENVIRONMENTS.
Project MOHOLE scientific and technical progress rept. for 15 Jun 64,
Battelle Memorial Inst., Columbus, Ohio.
Walter K. Boyd. 14 May 64, 27p
Contract NSF-C-260
Previously announced as PB-167 126.

Descriptors: (*Well logging, Feasibility studies), (*Corrosion, Deep water), (*Coatings, Corrosion inhibition), Cathodic protection, Fouling, Steel, Antifouling coatings, Titanium, Aluminum alloys, Paints.
Identifiers: Mohole project.

The report discusses the corrosion and fouling problems encountered in marine environments both at the surface and at great depths in the ocean, and the preventive measures currently available to deal with such problems. The conclusions are: No evidence has been developed to date which would suggest that presently used marine materials and protective systems cannot be successfully applied to deep-ocean environments; Fouling does not appear to be a problem in deep-ocean environments, thus eliminating the need for antifouling coatings on materials for use at these depths; Cathodic protection of steel by zinc and aluminum anodes was found to be complete in deep-ocean environments. Galvanized steel also performed satisfactorily. This suggests that sprayed zinc coatings sealed with an organic paint film would reduce the probability of premature Mohole drill string failures from corrosion or corrosion fatigue; Organic paint films properly applied and of sufficient thickness (say 8 to 12 mils) to reduce porosity appear to afford good protection to steel surfaces submerged in deep-ocean environments; It is expected that commercially available soluble matrix-type antifouling coatings with compatible anticorrosion paint systems will give the desired long-life protection to Mohole surface structures during the drilling operation; Titanium would be expected to be completely resistant to corrosion at all depths in the sea; Aluminum Alloy 5086 appears to be satisfactory for consideration in deep-ocean environments.
PB-175 096 HC$3.00 MF$0.65

RISER SYSTEM LATCH AND SETTING TOOL DESIGNS.
Project MOHOLE scientific and technical progress rept. for 15 Jun 64.
Brown and Root, Inc., Houston, Tex.
15 Jun 64, 9p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Mechanical fasteners, Pipes), Drilling, Mechanical drawings, Design.
Identifiers: Mohole project.

The report presents mechanical drawings of the riser system latch and setting tool. (Author)
PB-175 097 HC$3.00 MF$0.65

TESTING SYNTACTIC FOAM BUOYANCY MATERIALS, PROGRESS REPORT NO. 3.
MOHOLE scientific and technical progress rept. for 15 Jun 64.
General Motors Corp., Dayton, Ohio. Inland Mfg. Div.
15 Jun 64, 39p
Contract NSF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex., subcontract 63-45. See also PB-175 118.

Descriptors: (*Well logging, Feasibility studies), (*Buoys, *Foams), (*Expanded plastics, Buoys), Antifouling coatings, Epoxy plastics, Glass, Phenolic plastics, Composite materials, Hydrostatic tests, Compressive properties, Buoyancy, Absorption (Physical), Deep water.
Identifiers: Mohole porject.

The report covers the work done from May 1 through May 31, 1964. The entire series of test specimens from one Type II Module have been machined. Uncoated test specimens from this module have been submitted for testing and specimens requiring a coating have been submitted to the paint laboratory. Machining of test specimens from a second Type II Module is nearly complete. The preliminary evaluation of new syntactic foam compounds has continued with most of our efforts directed toward the development of buoyancy materials for shallow and intermediate depth applications.
PB-175 098 HC$3.00 MF$0.65

STAGE 'A' - RECOMMENDATIONS SONAR REENTRY.
Project MOHOLE scientific and technical progress rept. for 15 Jun 64.
Brown and Root, Inc., Houston, Tex.
15 Jun 64, 6p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, *Sonar), Costs, Drilling machines, Environmental tests, Jet engine noise, Procurement, Display systems, Signals, Specifications, Sensors, Electrical equipment.
Identifiers: Mohole project.

The recommendations herein are based on the use of sonar in the form of a low-cost down-pipe package which, used in conjunction with other equipment, will allow the driller to 'see' the landing base and to 'drive' the end of the pipe to it. It is anticipated that use of the riser casing, latched and acting as a mechanical guide, will be frequent and that the use of sonar will be occasional. It is recognized that sonar use will be increased if riser problems are encountered, but it is recommended that initial investment be held to a minimum. It is also recognized that extensive operational testing is necessary to familiarize drillers with the equipment and train them in ability to drive the pipe. Such testing must be performed in deep water using jet, derrick, rig, logging winch, and mud pumps. It is recommended that such tests be performed, but in conjunction with tests of landing base, casing, buoys, and drilling equipment, and that tests under this work project be limited to those involving sonar alone. Verification of jet noise levels calculated by General Motors must await testing at site depths.
PB-175 099 HC$3.00 MF$0.65

FIELD REPORT ON TESTING OF CONVENTIONAL CORE BARREL.
Project MOHOLE scientific and technical progress rept. for 15 Jun 64.
Brown and Root, Inc., Houston, Tex.
15 Jun 64, 17p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Specifications), Pumps, Mechanical drawings, Pipes, Weight, Pressure, Mud, Tests.
Identifiers: Mohole project.

The Drilling and Service spiral core barrel originally designed for the Mo-Hole Project was put in use on Station 1-A, Project Dribble, to core the initial interval from 1438 feet to 1520 feet. Four cores were cut in the interval which embraced two lithologic units. From 1438 feet to 1469.5 feet was a grey anhydrite friable to firm, and from 1469.5 feet to 1520 feet relatively pure salt was cored. The weight, RPM and pump pressure were all varied slightly in an attempt to reach a happy medium and define the optimum conditions for use with the barrel. Three deviation surveys were taken in the coring interval during the operation. The D and S spiral barrel has met all expectations and may be an answer to deviation problems in coring at other sites. (Author)
PB-175 100 HC$3.00 MF$0.65

LABORATORY TESTS OF PROTOTYPE 8-1/2 INCH WIRE-LINE CORING TURBODRILL FPR MOHOLE PROJECT.
Scientific and technical progress rept. for 15 Jun 64.
Dresser Industries, Inc., Dallas, Tex.
15 Jun 64, 95p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Specifications), Instrumentation, Bearings, Mud, Pumps, Diamonds, Hydraulic systems, Measurement, Dynamometers, Performance (Engineering), Tests.
Identifiers: Mohole project.

The general purpose of the laboratory test program was to determine certain factors concerning the characteristics of the Prototype 8-1/2 inch Wire-Line Coring Turbodrill and Instrument Package manufactured for Brown and Root, Inc., Project Mohole. (Author)
PB-175 101 HC$3.00 MF$0.65

DRILLING PERSONNEL BERTHING ARRANGEMENTS FOR MOHOLE VESSEL.
Scientific and technical progress rept. for 15 Jun 64.
Brown and Root, Inc., Houston, Tex.
15 Jun 64, 6p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Personnel, Scheduling), Personnel management, Management planning, Drilling machines, Weight, Pipes, Floats.
Identifiers: Mohole project, Drilling vessels.

Berthing accommodations are presented for personnel on each deck. Drilling equipment required for the Mohole vessel is described.
PB-175 102 HC$3.00 MF$0.65

SUMMARY.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
31 Jul 64, 65p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Marine engineering, Geophysical prospecting, Drilling, Drilling machines. Pipes, Floats, Ships, Propellers (Marine), Marine propulsion, Marine engines, Scheduling.
Identifiers: Mohole project.

Contents: Science; Naval architecture, marine engineering and instrumentation; Drilling engineering; Scheduling.
PB-175 103 HC$3.00 MF$0.65

SCIENCE SECTION.
Project MOHOLE scientific and technical progress rept. for 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
15 Jul 64, 9p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Sensors, Oceanographic equipment), Site selection, Texas, Basalt, Stresses, Ocean currents, Wind-direction indicators, Digital systems, Magnetic tape, Instrumentation, Ocean waves.
Identifiers: Mohole project.

The report discusses subcontract 63-37, titled: 'Deep Ocean Untended Digital Data Acquisition System, Telemetry System, and Anchoring System.' The system is designed to acquire data for deep-ocean current profiles and will include wind direction and velocity at the surface location. Also, water temperature data for approximately 2000 feet will be obtained, and information on wave motion is to be instrumented by use of an underwater pressure detector. A diagram of the underwater sensor profile is shown.
PB-175 104 HC$3.00 MF$0.65

GRAVITY AND MAGNETIC SURVEY UVALDE AREA PROJECT IN UVALDE AND ZAVALA COUNTIES, TEXAS.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
30 Jul 64, 63p
Contract NSF-C-260
Previously announced as PB-167 138.

Descriptors: (*Well logging, Feasibility studies), (*Geological survey, Texas), Gravity, Terrestrial magnetism, Structural geology, Maps, Basalt, Geophysical prospecting.
Identifiers: Mohole project.

The objective of the field survey was to locate an igneous intrusive mass (basalt) which could be drilled to a depth of at least 5000 feet for the purpose of testing coring and logging techniques. The combination of gravity and magnetic methods was selected as the most suitable means of delineating a basalt mass which would be satisfactory for the drill test. Each of the methods responds to changes in potential force fields which are related to the physical properties of underlying rocks. The force of gravity varies in response to lateral changes of density in the substrata; the magnetic field is affected by lateral variations in the susceptibilities of underlying rocks.
PB-175 105 HC$3.00 MF$0.65

NAVAL ARCHITECTURE, MARINE ENGINEERING, AND INSTRUMENTATION SECTION.
Project MOHOLE scientific and technical progress rept. for 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
15 Jul 64, 35p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Specifications, Hydrodynamics, Model tests, Structural properties, Analysis, Marine engineering, Ship hulls, Design, Floats, Propellers (Marine), Marine propulsion, Instrumentation.
Identifiers: Mohole project, Drilling vessels.

Contents: Contract plans and specifications; Hydrodynamics and model tests; Structural design and analysis; Arrangement; Machinery and hull systems; Positioning units.
PB-175 106 HC$3.00 MF$0.65

FORTRAN PROGRAM FOR DAMAGED STABILITY CALCULATIONS.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Gibbs and Cox, Inc., New York.
8 Jul 64, 8p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Computer programs, Stability), Moments, Ship hulls, Motion, Hydrodynamics, Floats.
Identifiers: Mohole project.

The program was developed to produce tables of displacements, each with its vertical, longitudinal and transverse moments and centers, for a systematic variation of draft, trim angle and heel angle. For any damage condition at an initial intact draft, the displacement and moments are computed and the final draft, trim angle and heel angle are obtained from the tables by interpolation.
PB-175 107 HC$3.00 MF$0.65

DAVID TAYLOR MODEL BASIN REPORTS. (4 SECTIONS).
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
31 Jul 64, 56p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Force (Mechanics)), Model tests, Moments, Wind tunnel models, Floats, Drilling machines, Fluid dynamic properties.
Identifiers: Mohole project, Drilling vessels.

Contents: Lateral forces and moments on Mohole platform; Low-speed wind-tunnel tests; Horizontal plane forces and moments on Mohole platform; 1:100 scale platform model tests.
PB-175 108 HC$3.00 MF$0.65

BUCKLING OF A CYLINDRICAL HULL WITH CIRCUMFERENTIAL AND LONGITUDINAL STIFFENING BETWEEN BULKHEADS SUBJECTED TO A UNIFORM EXTERNAL PRESSURE AND AXIAL LOAD.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64,
Brown and Root, Inc., Houston, Houston, Tex.
Paul R. Paslay. 31 Jul 67, 56p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship hulls, Buckling (Mechanics)), Cylindrical bodies, Pressure, Loading (Mechanics), Floats, Drilling machines, Stiffened cylinders, Mathematical prediction.
Identifiers: Mohole project, Drilling vessels.

A procedure is derived which, for a given hull and axial load predicts the uniform external pressure which will induce buckling. (Author)
PB-175 109 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
31 Jul 64, 33p
Contract NSF-C-260
See also PB-175 131.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Structures, Drilling, Hoists, Pipes, Positioning devices (Machinery), Couplings, Supports, Buoys, Cutting fluids, Drills, Performance (Engineering).
Identifiers: Mohole project.

Contents: Derrick and substructure; Hoisting system; Pipe handling; Rotating equipment; Drill pipe; Riser system; Riser support system; Mud system; Down-hole drills; Equipment evaluation test program.
PB-175 110 HC$3.00 MF$0.65

PRELIMINARY STUDY VISUAL ACCESS DRILLER TO SPIDER DECK.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
ARMCO Steel Corp., Torrance, Calif.
1 Jul 64, 12p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Closed circuit television, Drilling), Hoists, Design, Structures, Periscopes, Visibility, Viewing screens, Procurement, Scheduling, Test equipment.
Identifiers: Mohole project.

Contents: Preliminary study--Visual access, driller to spider deck; Design of drawworks; Technical requirements, design and procurement--Crown and traveling blocks; Schedule of demonstration of mock-up inspection equipment.
PB-175 111 HC$3.00 MF$0.65

RFP NO. 72 TITANIUM DRILL PIPE EXTRUSION INVESTIGATIONS.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
31 Jul 64, 12p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Drilling), (*Titanium, Pipes), (*Extrusion, Titanium), Manufacturing methods, Specifications, Couplings, Design.
Identifiers: Mohole project.

The article presents the specifications for the development of a means of fabrication of titanium drill pipe for Project Mohole.
PB-175 112 HC$3.00 MF$0.65

COMULATIVE FATIGUE DAMAGE ASSESSMENT. PROGRESS REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
31 Jul 64, 10p
Contract NSF-C-260
See also PB-175 134.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Bending, Torsion, Experimental data, Sea water, Air.
Identifiers: Mohole project, Drill pipes.

Tests were made on specimens cut from the S-135 Drill Pipe. Preliminary results taken indicate that the value of lambda, which relates the fatigue strength in bending to the fatigue strength in torsion, might be expected to be approximately .92 to .94 for tests run in air and approximately .30 to .41 for tests run in sea water.
PB-175 113 HC$3.00 MF$0.65

CORROSION FATIGUE STUDIES.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Battelle Memorial Inst., Columbus, Ohio.
10 Jul 64, 10p
Contract NSF-C-260
See also PB-175 176.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Corrosion, Steel, Cathodic protection, Sea water, Zinc coatings.
Identifiers: Mohole project, Drill pipes.

Progress is reported of an investigation of S-135 steel drill pipes in the following areas: corrosion fatigue, corrosion, hydrogen stress cracking and fracture resistance.
PB-175 114 HC$3.00 MF$0.65

RISER CASING STRESS ANALYSIS PROGRAM.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
National Engineering Science Co., Pasadena, Calif.
9 Jun 64, 53p
Contract NSF-C-260
Prepared in cooperation with Brown and Root, Inc., Houston, Tex. under subcontract 63-30.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Drilling, Drag, Loading (Mechanics), Ocean waves, Vibration, Buoys, Mathematical analysis.

Topics covered, and tentative conclusions are: (a) Techniques are available for determining the size of passive buoys required in order to minimize the steady current loads on the riser. However, minimum drag may not be optimum drag, because it may be necessary to provide significant damping to ameliorate any reasonant vibration problem that may develop. (b) Trivial differences in the frequency of natural vibration result from considering the variation of riser tension along the length of the riser, as it will exist, or from simplifying the problem and treating the riser as under constant tension. (c) It appears that severe idealizations or simplifications will not be necessary in solution of the static problem of the riser under steady current loads. (d) The first natural frequency in transverse vibration will be well below the frequencies of significant waves, and of barge roll and pitch. Higher mode frequencies may be important. (Author)
PB-175 115 HC$3.00 MF$0.65

LINER-CASING HANGER AND SETTING TOOL PROTOTYPE.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
1964, 31p
NSF-C-260
Previously announced as PB-167 156.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, *Supports), (*Disconnect fittings, Pipes), Drilling machines, Design, Mechanical drawings, Operation.
Identifiers: Mohole project, Casing.

The hanger is of such design that it will not permit disengagement of the setting tool until the hanger is in the proper position within the landing base. Vertical and lateral blows on the liner casing or the casing hanger itself will not cause accidental release of the setting tool. The setting, locking and releasing will all be automatically accomplished by vertical reciprocating motion of the drill pipe. The design of the casing hanger is such as to permit the nesting of one hanger inside of another as successive strings of liner casing are run one inside the other. The design of the casing hanger is compatible with the operation of the riser to base latch and will permit the nesting of that tool inside of the last casing hanger installed in the landing base. The setting tool is adaptable to other uses than the setting of liner casing hangers. A releasable latch lock tool has been developed using the same setting tool as will be employed in the prototype tests. (Author)
PB-175 116 HC$3.00 MF$0.65

7 IN. RISER TO BASE LATCH-PROTOTYPE.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
1964, 37p
Contract NSF-C-260
Previously announced as PB-167 150.

Descriptors: (*Well logging, Feasibility studies), (*Mechanical fasteners, Pipes), Disconnect fittings, Mechanical drawings, Seals, Design.
Identifiers: Mohole project.

All of the operating mechanism is enclosed in an oil bath to prevent corrosion fatigue that might be brought about by sea water environment. A discreet pressure balance is maintained within the tool at all times to prevent the possibility of malfunction due to the action of any pressure differential. When in place within the landing base throat, the latch tool encapsulates itself by providing an upper and lower sealing device. These two seals at opposite ends of the tool provide the capability of a preselected environment. A 'slug' or 'pill' of oil could very easily be spotted within the landing base throat at the time of engagement so that the tool would be completely protected from corrosion attack. This prototype will engage and lock into a groove of the same size and configuration as that used in setting the casing string.
PB-175 117 HC$3.00 MF$0.65

TESTING SYNTACTIC FOAM BUOYANCY MATERIALS. PROGRESS REPORT NO. 4.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
General Motors Corp., Dayton, Ohio. Inland Manufacturing Div.
31 Jul 64, 32p
Contract NSF-C-260
Prepared in cooperation with Brown and Root, Inc., Houston, Tex., under subcontract 63-45. See also PB-175 139.

Descriptors: (*Well logging, Feasibility studies), (*Buoys, *Foams), (*Expanded plastics, Buoys), Buoyancy, Tests, Epoxy plastics, Glass, Phenolic plastics, Composite materials, Absorption (Physical), Hydrostatic tests, Deep water.
Identifiers: Mohole project.

The entire series of test specimens from two Type II Modules have been machined. All ambient temperature hydrostatic, compressive, shear, tensile and flexural tests have been conducted on uncoated specimens. All coated test specimens have been submitted for testing. A heating and cooling unit has been installed on our Baldwin machine and the various tests to be conducted at 130F are nearly complete. Two 24 inch x 24 inch x 2.5 inch panels from which the required test specimens are being machined as part of the secondary task. Research and development work with 6 inch x 6 inch x 2.5 inch castings has continued on new syntactic foam compounds and on new processing techniques. A technique has been developed for casting to size quite accurately thereby reducing major machining operations.
PB-175 118 HC$3.00 MF$0.65

REPORT ON MARINE ATTACK OF INLYTE FLOAT MATERIAL.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
10 Jun 64, 7p
Contract NSF-C-260
Prepared in cooperation with Government Products Lab. See also PB-175 140.

Descriptors: (*Well logging, Feasibility studies), (*Foams, Degradation), (*Expanded plastics, Degradation), Plastic coatings, Liquid immersion tests, Fouling, Marine borers, Experimental data, Floats, Antifouling coatings.
Identifiers: Mohole project.

An investigation was made to determine what effects marine organisms produced on Inlyte float materials after long periods of total immersion.
PB-175 119 HC$3.00 MF$0.65

CORING TURBODRILL OPERATING AND MAINTENANCE MANUAL.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Dresser Industries, Inc., Dallas, Tex. Turbodrill Div.
Jun 64, 53p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Instruction manuals), Hydraulic systems, Lubrication, Torque, Maintenance, Bearings, Measurement, Drills, Tests.
Identifiers: Mohole project.

The manual contains certain general information about Dresser turbodrills and specific data on the prototype 8-1/2 in. wireline coring turbodrill produced for the Mohole Project, Subcontract No. 62-01. The purpose of the manual is to acquaint operating and supervisory personnel with the construction and characteristics of the coring turbodrill and recommended operating procedures. (Author)
PB-175 120 HC$3.00 MF$0.65

INSTRUCTION MANUAL OPERATION, MAINTENANCE AND REPAIR OF LANE-WELLS DRILLING-CORING MONITOR.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
31 Jul 64, 25p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Instruction manuals), Maintenance, Power supplies, Electronic equipment, Test methods, Drills, Pipes, Electric cables, Operation, Meters, Design.
Identifiers: Mohole project.

The Lane-Wells Drilling-Coring Monitor is designed to operate with the Dresser Turbocorer. The system consists of a downhole package to which is attached the core barrels, and surface equipment which displays information received from downhole. The downhole package is lowered into the drill pipe on a wire line and seated in the Turbocorer. Information from downhole package is transmitted up the wireline and displayed on meters at the surface. (Author)
PB-175 121 HC$3.00 MF$0.65

EQUIPMENT EVALUATION PROGRAM PROPOSAL.
Project MOHOLE, scientific and technical progress for the period ending 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
13 May 64, 45p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Site selection, Drilling machines, Mud, Additives, Reduction, Costs, Specifications.
Identifiers: Mohole project.

The report proposes the drilling of a 5000 foot well for testing and evaluating equipment which will be used in drilling the Mohole. The drilling of this well is mandatory to expedite the program of research and development which is planned for this Project. This test well will accomplish two main objectives: (1) It will provide the fastest and most economical means of testing the newly-developed equipment and (2) It will provide a testing medium where scientific control of the environment can be established and maintained for an extended period of time. In this manner, development time will be reduced to a minimum and the performance capabilities of each development will be scientifically ascertained. These are advantages which will be reflected in drilling the Mohole. By speeding up development time and providing better performance of tools and equipment, the proposed test hole will effect savings which will offset its cost.
PB-175 122 HC$3.00 MF$0.65

DRILLING EQUIPMENT WEIGHT ESTIMATES.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
31 Jul 64, 7p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Weight), Hoists, Pumps, Tanks (Containers), Structures, Drilling, Instrumentation.
Identifiers: Mohole project.

The report lists drilling equipment weight estimates on project Mohole vessel conditions one thru five.
PB-175 123 HC$3.00 MF$0.65

SCHEDULING AND SUBCONTRACTS SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 64.
Brown and Root, Inc., Houston, Tex.
31 Jul 64, 25p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Scheduling, Research program administration, Costs, Design, Procurement.
Identifiers: Mohole project.

A 3-page computer printout of activities is arranged in early start sequence. This excerpt, taken from the 'IJ' sequence printout dated July 1, 1964, was printed as a convenience in providing the scheduled dates for awarding subcontracts and major purchase orders. The companion document to a full 37-page computer printout dated July 1, 1964, represents the interrelationship of activities and sequencing of activities to reach major events on the schedule for Phase II of Project Mohole.
PB-175 124 HC$3.00 MF$0.65

SUMMARY.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 64.
Brown and Root, Inc., Houston, Tex.
31 Aug 64, 15p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Specifications), Pipes, Fatigue (Mechanics), Sea water, Corrosion, Measurement, Drilling machines, Mud, Weight, Cutting fluids, Steel, Cables (Mechanical), Titanium alloys.
Identifiers: Mohole project.

In the area of logging and measurements, a dummy logging cable, composed of several cascaded resistance-capacitance sections, has been designed for use in laboratory checkout of the various downhole tools. The research and development of Drill Pipe continues in a number of areas. Previous corrosion fatigue tests, conducted by Battelle, in unagitated sea water indicated that a calcareous scale deposit formed during testing, and it was questioned whether or not this phenomena might have significant effect on the test results. The subcontractor has performed further corrosion fatigue tests in agitated sea water, and it was concluded that agitation partially eliminates the scale; therefore, its effect on the specimen under test. In the search for alternate drill pipe materials, proposals were received during the past month from companies interested in performing extrusion development work on titanium alloy drill pipe. The degassing component of the mud system has been tested to determine the requirements of this particular unit. Volumetrically, the tests indicate that two degasser units in the system will handle the maximum drilling fluid volume requirements that can be expected in the operations. (Author)
PB-175 125 HC$3.00 MF$0.65

SCIENCE SECTION. PROJECT MOHOLE PRESENTATION TO BUREAU OF YARDS AND DOCKS, U. S. NAVY DEPARTMENT.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 64.
Brown and Root, Inc., Houston, Tex.
31 Jul 64, 26p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Site selection, Well logging), Hawaii, Atlantic Ocean, Seismic waves, Refraction, Basalt, Faults (Geology), Puerto Rico, Measurement, Remote control systems, Instrumentation.
Identifiers: Mohole project, Mantle (Geology), Core sampling.

The report discusses the overall purpose of the project, geophysical properties of proposed sites for the project, and logging techniques and equipment for a typical logging operation.
PB-175 126 HC$3.00 MF$0.65

NAVAL ARCHITECTURE SECTION. PROJECT MOHOLE PRESENTATION TO BUREAU OF YARDS AND DOCKS U. S. NAVY DEPARTMENT.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 64.
Brown and Root, Inc., Houston, Tex.
31 Jul 64, 60p
Contract NSF-C-260
Availability: Original document in color until exhausted.

Descriptors: (*Well logging, Feasibility studies), (*Ships, Design), Floats, Drilling machines, Propellers (Marine), Marine propulsion, Structures, Hydrodynamics, Marine engineering.
Identifiers: Mohole project, Drilling vessels.

Contents: Introduction to stabilized platform; Positioning of platform; Positioning system; Arrangement, structure and structural analysis; Hydrodynamic studies; Logistics; Summation.
PB-175 127 HC$3.00 MF$0.65

PROGRESS REPORTS 12 AND 13.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 64.
Gibbs and Cox, Inc., New York.
31 Aug 64, 10p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Ship hulls, Floats, Drilling machines, Electrical equipment, Propellers (Marine).
Identifiers: Mohole project.

A report is presented on progress made during the period July 10, 1964 - August 7, 1964 on the hull, machinery, and electrical equipment.
PB-175 128 HC$3.00 MF$0.65

POSITIONING RESPONSE STUDY.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 64.
Stevens Inst. of Tech., Hoboken, N. J.
31 Aug 64, 11p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ships, Maneuverability), Drilling machines, Floats, Marine propulsion, Control systems, Response, Steering, Motion.
Identifiers: Mohole project, Drilling vessels.

Two basic procedures, using the attached starting conditions, are proposed to study the positioning response and course of the platform in station-keeping maneuvers: Maneuver basically with main propulsion units and assist with steering units; and Maneuver with steering units only and compensate for steady state forces with main propulsion units.
PB-175 129 HC$3.00 MF$0.65

ON THE STABILITY OF RECTANGULAR PLATES REINFORCED BY STIFFENERS AND SUBJECTED TO BENDING AND SHEARING.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 64.
Brown and Root, Inc., Houston, Tex.
31 Aug 64, 29p
Contract NSF-C-260
Previously announced as part of PB-167 166.

Descriptors: (*Well logging, Feasibility studies), Structural parts, Shear stresses, Bending, Rectangular bodies, Stability, Reinforcing materials, Mathematical analysis.
Identifiers: Mohole project.

The report deals with the problem of stability in the elastic region of rectangular, thin slabs which are strengthened with horizontal and vertical stiffeners and stressed simultaneous by bending, compression and shear. The investigation was based on the differential equation of the elastic surface. In this way, insofar as shape and stresses are concerned, a more general treatment of the problem was possible. As an application, two special cases were treated: a slab reinforced in accordance with practical ideas subjected to pure bending, as well as to bending and shear, the critical values of the stresses being given in tabular form in dependence on the stiffenings. (Author)
PB-175 130 HC$3.00 MF$0.65

DRILLING SECTION. PROJECT MOHOLE PRESENTATION TO BUREAU OF YARDS AND DOCKS, U. S. NAVY DEPARTMENT.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 64.
Brown and Root, Inc., Houston, Tex.
31 Jul 64, 42p
Contract NSF-C-260
See also PB-175 155.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Drilling, Pipes, Underwater equipment, Mining engineering.
Identifiers: Mohole project.

Contents: Drilling techniques; Drilling equipment; Riser system; Drill pipe research and development; Bore hole re-entry.
PB-175 131 HC$3.00 MF$0.65

DERRICK AND SUBSTRUCTURE.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 64.
Gibbs and Cox, Inc., New York.
31 Aug 64, 36p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Structures), Foundations (Structures), Hoists, Pipes, Positioning devices (Machinery), Supports, Cutting fluids, Drills, Performance (Engineering).
Identifiers: Mohole project.

The report summerizes progress in the following areas of Project Mohole: derrick and substructure, hoisting system, pipe handling, rotating equipment, drill pipe, riser system, riser support system, mud system, down-hole drills and equipment evaluation test program.
PB-175 132 HC$3.00 MF$0.65

DESIGN AND PROCUREMENT OF CONVENTIONAL TYPE DRAWWORKS.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 64.
ARMCO Steel Corp., Torrance. National Supply Div.
31 Aug 64, 20p
Contract NSF-C-260
See also PB-175 157.

Descriptors: (*Well logging, Feasibility studies), (*Hoists, Drilling machines), (*Pipes, Fatigue (Mechanics)), Drilling, Design, Corrosion, Fracture (Mechanics), Stresses.
Identifiers: Mohole project.

Progress is reported on the design of the drawworks for Project Mohole and also on corrosion fatigue studies of drill pipe.
PB-175 133 HC$3.00 MF$0.65

CURTISS-WRIGHT PROGRESS REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 64.
Curtiss-Wright Corp., Caldwell, N. J.
23 Jul 64, 11p
Contract NSF-C-260
See also PB-175 159.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Bending, Torsion, Sea water, Experimental data.
Identifiers: Mohole project, Drill pipes.

A report is made of fatigue strength of S-135 drill pipe in sea water.
PB-175 134 HC$3.00 MF$0.65

AMF-TUBOSCOPE PROGRESS REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 64.
AMF Tuboscope, Inc.
18 Aug 64, 17p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Non-destructive testing, *Pipes), Electronic equipment, Rings, Sensitivity, Instrumentation, Joints, Machining, Fatigue (Mechanics), Machine tools.
Identifiers: Mohole project, Drill pipes.

The report describes contractor's activities on the following: Platform drill pipe sonde; Riser casing sonde; New drill pipe and new riser casing inspection; Threads; Recording instruments; Pipe identification rings. (Author)
PB-175 135 HC$3.00 MF$0.65

NESCO PROGRESS REPORTS TO JUNE 20 AND JULY 31, 1964. RISER CASING STRESS ANALYSIS.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 64.
National Engineering Science, Co, Pasadena, Calif.
7 Jul 64, 46p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Configuration, Force (Mechanics), Motion, Dynamics, Buoys, Supports.
Identifiers: Mohole project, Casing.

Astudy was made to define the idealized boundary conditions encountered in the analysis of the Mohole riser; to list for analysis the configurations that are determined by combinations of boundary conditions; to summarize the physical properties of the riser system as now comtemplated; and to list the forces and motions that might be applied to the riser system.
PB-175 136 HC$3.00 MF$0.65

ANALYSIS FOR STATIC LOADING CONDITIONS: (a) CONFIGURATION FOR NORMAL DRILLING. CONFIGURATION NO. 5 WITHOUT DRILLING.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 64.
National Engineering Science Co., Pasadena, Calif.
31 Aug 64, 74p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Beams (Structural)), Loading (Mechanics)), Deflection, Drilling, Configuration, Statics, Equations, Mathematical analysis.
Identifiers: Mohole project.

Detailed analysis for static loading conditions for various configurations and conditions.
PB-175 137 HC$3.00 MF$0.65

ANALYSIS FOR DYNAMIC CONDITIONS: -- (a) DYNAMICS OF A LONG ELASTIC CYLINDER IN A FLUID.
Project MOHOLE scientific and technical progress repts. for 15 Aug 64.
Brown and Root, Inc., Houston, Tex.
15 Aug 64, 131p
Contract NSF-C-260
Availability: Microfiche only after original copies are exhausted.

Descriptors: (*Well logging, Feasibility studies), (*Cylindrical bodies, Fluid dynamic properties), Elasticity, Loading (Mechanics), Mathematical models, Pipes.
Identifiers: Mohole project.

The report consists of equations describing the dynamics of the riser.
PB-175 138 HC$3.00 MF$0.65

TESTING SYNTACTIC FOAM BOUYANCY MATERIALS. PROGRESS REPORT NO. 5.
Project MOHOLE scientific and technical progress rept. for 15 Aug 64.
General Motors Corp., Dayton, Ohio. Inland Mfg. Div.
15 Aug 64, 69p
Contract NSF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex., subcontract 63-45. See also PB-175 118.

Descriptors: (*Well logging, Feasibility studies), (*Buoys, *Foams), (*Expanded plastics, Buoys), Buoyancy, Tests, Epoxy plastics, Glass, Phenolic plastics, Composite materials, Experimental data, Deep water, Antifouling coatings.
Identifiers: Mohole porject.

All test data for the primary task, on specimens cut from two Type II Modules are complete. As part of the secondary Task, tensile, shear, flexural, compressive and hydrostatic test specimens from four 24 inch x 24 inch x 2.5 inch panels have been submitted for testing, and similar specimens are being machined from a fifth panel. Coated test specimens from the Type II Modules have been analyzed for determination of coating thickness in an effort to establish specification limits for spray-applied coatings.
PB-175 139 HC$3.00 MF$0.65

MARINE ATTACK OF INLYTE FLOAT MATERIALS.
Project MOHOLE scientific and technical progress rept. for 15 Aug 64.
Brown and Root, Inc., Houston, Tex.
15 Aug 64, 7p
Contract NSF-C-260
See also PB-175 119.

Descriptors: (*Well logging, Feasibility studies), (*Foams, Degradation), (*Expanded plastics, Degradation), Plastic coatings, Liquid immersion tests, Fouling, Marine borers, Experimental data, Floats, Antifouling coatings, Thermosetting plastics, Composite materials.
Identifiers: Mohole project.

An investigation was made to determine what effects marine organisms produced on Inlyte float materials after long periods of total immersion.
PB-175 140 HC$3.00 MF$0.65

SALT WATER DEGASSER TESTS.
Project MOHOLE scientific and technical progress rept. for 15 Aug 64.
Brown and Root, Inc., Houston, Tex.
15 Aug 64, 22p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Cutting fluids, *Degasification), Viscosity, Drilling machines, Flowmeters, Drills, Pressure, Mud, Pumps.
Identifiers: Mohole project.

The purpose of the pressure volume tests conducted by Swaco personnel at Houston, Texas, was to determine volume operating characteristics of the salt water control drilling mud d-gassing unit. (Author)
PB-175 141 HC$3.00 MF$0.65

DRILLING FLUIDS - OPERATING PROCEDURE.
Project MOHOLE scientific and technical progress rept. for 15 Aug 64.
Brown and Root, Inc., Houston, Tex.
15 Aug 64, 23p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Cutting fluids), Water tanks, Sea water, Mud, Pumps, Valves, Tests, Instruction manuals, Mining engineering.
Identifiers: Mohole project.

Contents: Operation procedures for handling of drilling fluids; Procedure for making up initial salt water mud; Displacement of salt water system with fresh water; Procedure for adding oil to system; Making up new oil emulsion drilling fluid; Procedure for making up oil base mud; Projected mud tank volumes.
PB-175 142 HC$3.00 MF$0.65

SCHEDULING SECTION. PROJECT MOHOLE PRESENTATION TO BUREAU OF YARDS AND DOCKS U. S. NAVY DEPARTMENT.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 64.
Brown and Root, Inc., Houston, Tex.
31 Jul 64, 19p
Contract NSF-C-260
See also PB-175 070.

Descriptors: (*Well logging, Feasibility studies), (*Scheduling, Research program administration), Management engineering, Diagrams.
Identifiers: Mohole project.

The report describes the critical path method of scheduling all activities of Project Mohole. It includes a computer printout with activities arranged in early start sequence and the basic CPM activity network.
PB-175 143 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING SEPTEMBER 15, 1964.
Brown and Root, Inc., Houston, Tex.
30 Sep 64, 16p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Specifications), Power, Wind, Drilling machines, Pressure, Tests, Pipes.
Identifiers: Mohole project.

Continuing work on contract plans and specifications, two meetings were held during the past period between the staff and the design agent, Gibbs and Cox. The first discussion centered around the approach to be used in developing the final design for the vessel positioning units. The concept of the power plant calls for a total of 16 diesel engine driven generator units. As indicated previously, the derrick and substructure will be of welded sections, designed to support a static hook load of 1,000,000 lb and withstand a steady wind velocity of 100 mph (from top to bottom) with a maximum 20,000 ft of drill pipe racked inside the derrick. Guide rails are to be provided for traveling block, power sub, and elevators, and these are designed to withstand safely all dynamic loads associated with sea state 7 conditions. Calculations have been made to determine various loads (such as dead load, hook, rotary table, equipment, wind, and all dynamic loads) imposed on A-Deck by the derrick and substructure. Wind loads are based on 140-knot-per-hour velocity and a uniform pressure of 65 psf on all exposed surfaces; dynamic loading has been obtained by superimposing all of the plat-

form accelerative motions that simultaneously result from heave, surge, sway, roll, pitch, and yaw. (Author)
PB-175 144 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING SEPTEMBER 30, 1964, SCIENCE SECTION.
Brown and Root, Inc., Houston, Tex.
30 Sep 64, 56p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Laboratories, Shipborne), Mechanical drawings, Laboratory equipment.
Identifiers: Mohole project.

The scientific laboratory area of the drilling platform was revised to conform to the bulkhead and framing arrangement. The laboratory furniture arrangements were reviewed and updated, and the utility requirements for each particular laboratory were further defined. Drawings of the laboratory arrangements are presented.
PB-175 145 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING SEPTEMBER 15, 1964: NAVAL ARCHITECTURE, MARINE ENGINEERING , AND INSTRUMENTATION SECTION.
Brown and Root, Inc., Houston, Tex.
30 Sep 64, 25p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Specifications, Shipyards, Hydrodynamics, Model tests, Structural properties, Analysis, Stresses, Floats, Design, Marine engineering, Propellers (Marine), Marine propulsion, Power, Communication systems, Navigation, Personnel, Instrumentation.
Identifiers: Mohole project, Drilling vessels.

Contents: Contract plans and specifications; Shipyard facilities survey; Hydrodynamics and model tests; Structural design and analysis; Stress analysis; Arrangement; Positioning units; Vessel positioning system; Power plant; Communications and navigation equipment; Marine personnel requirements.
PB-175 146 HC$3.00 MF$0.65

PROJECT MOHOLE: FLOATING DRILLING PLATFORM, VESSEL POSITIONING SYSTEM.
Proj repts. no. 14-15.
Gibbs and Cox, Inc., New York.
31 Aug 64, 39p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Propeller noise, Sonar), (*Ships, Design), Drilling machines, Floats, Propellers (Marine), Marine propulsion, Control systems, Specifications, Sonar equipment, Signal-to-noise ratio.
Identifiers: Mohole project, Drilling vessels.

Possible effects of propeller noise on operation of sonar equipment are discussed. A listing is given of information to permit development of contract plans and specifications for the floating drilling platform.
PB-175 147 HC$3.00 MF$0.65

PROPELLER DESIGN AND MODEL TEST ANALYSIS WORK STATEMENT.
Project Mohole scientific and technical progress for the period ending 15 Sep 64.
Brown and Root, Inc., Houston, Tex.
30 Sep 64, 5p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Hydrodynamics), Model tests, Marine propulsion, Drilling machines, Floats, Propellers (Marine), Design, Analysis, Yaw, Moments, Force (Mechanics).
Identifiers: Mohole project, Drilling vessels.

An outline is given of the items to be designed and data analysis necessary.
PB-175 148 HC$3.00 MF$0.65

SPECTRAL ANALYSIS DATA. PLOTS OF RESPONSE OPERATORS.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 64.
Stevens Inst. of Tech., Hoboken, N. J.
Jun 64, 38p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Fluid dynamic properties), Roll, Acceleration, Ocean waves, Pitch (Motion), Floats, Drilling machines, Tables, Response.
Identifiers: Mohole project, Drilling vessels.

Statistical data are presented in tabular and graphical form of the hydrodynamic properties of models of the drilling platform.
PB-175 149 HC$3.00 MF$0.65

MODEL TESTS OF PROJECT MOHOLE DRILLING PLATFORM.
Final rept.,
Michigan Univ., Ann Arbor. Dept. of Naval Architecture and Marine Engineering.
F. C. Michelsen, and N. Rabe. Aug 64, 118p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Model tests), (*Propellers (Marine), Model tests), Floats, Drilling machines, Steering, Marine propulsion, Control systems.
Identifiers: Mohole project, Drilling vessels.

Contents: Models and instrumentation (drilling platform and main propellers, positioning unit); Data and full scale performance predictions (towing tests (EHP tests), open water tests of main propellers, self-propulsion tests, steering propulsion unit).
PB-175 150 HC$3.00 MF$0.65

MARINE OPERATIONS PERSONNEL REQUIREMENTS.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 64.
Brown and Root, Inc., Houston, Tex.
17 Sep 64, 22p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Personnel, Marine engineering), Personnel management, Job analysis, Shipborne, Labor, Costs, Management planning.
Identifiers: Mohole project.

The Drilling Platform and Supply Vessel marine manning requirements are considered firm for planning purposes. Individual organization charts are included which depict the basic marine organizations. The Drilling Platform and Supply Vessel charts were then combined with the necessary marine shore base personnel. The Shore Base complement includes the necessary persons to support all marine operations. Additionally, the communications, medical, administration and air-helicopter complements are of sufficient strength to support the overall program. (Author)
PB-175 151 HC$3.00 MF$0.65

SHIPYARD FACILITIES SURVEY.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 64.
Brown and Root, Inc., Houston, Tex.
30 Sep 64, 5p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Shipyards, Feasibility studies), Ships, Construction, Floats, Drilling machines.
Identifiers: Mohole project, Drilling vessels.

The purpose of the report is to survey shipyard facilities which may be capable of building the drilling vessel. A proposed bidder's list for platform construction is included.
PB-175 152 HC$3.00 MF$0.65

FINAL DESIGN CONCEPTS FOR POSITIONING UNITS, MOHOLE DRILLING VESSEL.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 64.
Western Gear Corp., Lynwood, Calif. Systems
Aug 64, 141p SMR-221
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Propellers (Marine), Design), Operation, Floats, Drilling machines, Marine propulsion, Steering, Bearings.
Identifiers: Mohole project, Drilling vessels.

The purpose of the report is to summarize the results of the preliminary studies concerning the design, installation and operation of the Positioning Units for the Mohole Drilling Vessel. The conceptual designs have progressed to a stage where they are ready to submit for bids for manufacturing. The report therefore discusses the overall concept and describes the designs in some detail. The basic parameters which have been used as guidelines for the study are recorded for reference.
PB-175 153 HC$3.00 MF$0.65

STABILITY ANALYSIS OF SECTION OF MOHOLE PLATFORM LOWER HULL BETWEEN BULKHEADS.
Project MOHOLE scientific and technical progress for the period ending 30 Sep 64,
Brown and Roote, Inc., Houston, Tex.
Paul R. Paslay. Oct 64, 80p Rept. no. 1
Contract NSF-C-260
Previously announced as part of PB-167 166.

Descriptors: (*Well logging, Feasibility studies), (*Ship hulls, Buckling (Mechanics)), Panels (Structural), Cylindrical bodies, Loading (Mechanics), Floats, Drilling machines, Stability, Pressure.
Identifiers: Mohole project, Drilling vessels.

The possibility of local panel buckling in the Mohole platform lower hull is investigated. The configuration of a section of the hull is idealized to be a thin cylindrical shell with discrete, internal, circumferential and longitudinal stiffeners. The loading is idealized to be composed of two parts which are (1) a uniform external pressure applied to the hull and to the bulkheads and (2) an axial load which is applied through the bulkheads. An analytical procedure is derived which predicts the pressure necessary for buckling in the case of a specified axial load. Results of the analytical procedure are given for five possible lower hull configurations as well as for a case whose experimental buckling pressure was reported earlier. The comparison between the experimental and analytical buckling pressures was encouraging as they differed by only a few per cent. The results of the study can be used to analytically estimate the depth to which the lower hull may be submerged before local shell buckling occurs and consequently the results can be used to help evaluate various lower hull designs. (Author)
PB-175 154 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING SEPTEMBER 15, 1964, DRILLING SECTION.
Brown and Root, Inc., Houston, Tex.
30 Sep 64, 50p
Contract NSF-C-260
See also PB-175 174.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Structures, Drilling, Loading (Mechanics), Hoists, Couplings, Pipes, Corrosion, Fatigue (Mechanics),

Supports, Buoys, Cutting fluids, Drills, Performance (Engineering).
Identifiers: Mohole project.

Contents: Derrick and substructure; Hoisting system; Rotating equipment; Drill pipe; Riser system; Riser support system; Mud system; Down-hole drills; Equipment evaluation test program.
PB-175 155 HC$3.00 MF$0.65

EXPLANATION OF LOADS ON 'A' DECK FROM DERRICK AND SUBSTRUCTURE.
Project MOHOLE scientific and technical progress for the period ending 30 Sep 64.
Brown and Root, Inc., Houston, Tex.
30 Sep 64, 5p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship decks, Loading (Mechanics)), Ship structural components, Floats, Drilling machines, Hydrodynamics, Gust loads.
Identifiers: Mohole project, Drilling vessels.

Statistical data are given on dead load, hook load, rotary table load, equipment load, wind load, and dynamic load.
PB-175 156 HC$3.00 MF$0.65

DESIGN AND PROCUREMENT OF CONVENTIONAL TYPE DRAWWORKS.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 64.
National Supply Div., Torrance, Calif.
31 Aug 64, 12p
Contract NSF-C-260
See also PB-175 175.

Descriptors: (*Well logging, Feasibility studies), (*Hoists, Drilling machines), Drilling, Design, Mechanical drawings, Specifications, Performance (Engineering), Brakes, Clutches.
Identifiers: Mohole project.

Engineering design studies were devoted primarily to preliminary layout specification and performance analysis of the drawworks brake system. Both the drawworks brake mechanism and the two auxilliary brakes are under consideration. Study is progressing on the design requirements for the eddy current and hydromatic brake installations. The design calculations and layouts of the overrunning clutch required for the hydromatic brake installation are nearly completed to the extent of available information furnished by Parkersburg.
PB-175 157 HC$3.00 MF$0.65

TENTATIVE SPECIFICATIONS FOR DRILL PIPE FOR INITIAL MOHOLE DRILLING STRING.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 64.
Brown and Root, Inc., Houston, Tex.
1964, 17p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Specifications), Drilling, Steel, Mechanical drawing, Configuration.
Identifiers: Drill pipes, Mohole project.

The specification covers high strength seamless alloy steel drill pipe. The pipe shall be furnished with upsets for flashwelding. Dimensional tolerances and process requirements are given.
PB-175 158 HC$3.00 MF$0.65

CUMULATIVE FATIGUE DAMAGE ASSESSMENT.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 64.
Curtiss-Wright Corp., Caldwell, N. J. Curtiss Div.
8 Sep 64, 11p
Contract NSF-C-260
See also PB-175 177.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Bending, Torsion, Sea water, Stresses, Cracks, Experimental data.
Identifiers: Mohole project, Drill pipes.

A report is made of axial fatigue tests on S-135 drill pipe material with starting cracks of various sizes.
PB-175 159 HC$3.00 MF$0.65

CORROSION FATIGUE STUDIES.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 64.
Battelle Memorial Inst., Columbus, Ohio.
9 Sep 64, 21p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Corrosion, Stresses, Steel, Impact tests, Sea water, Fracture (Mechanics), Experimental data, Cracks.
Identifiers: Mohole project, Drill pipes.

A report is made of corrosion fatigue studies, hydrogen stress cracking, and fracture resistance of S-135 steel.
PB-175 160 HC$3.00 MF$0.65

PROJECT MOHOLE PROGRESS REPORT TO BROWN AND ROOT, INC.
Scientific and technical progress for the period ending 15 Sep 64.
AMF Tuboscope, Inc., Houston, Tex.
1 Sep 64, 59p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Non-destructive testing, *Pipes), Design, Rings, Specifications, Electronic equipment, Instrumentation, Recording systems, Electric cables, Bibliographies, Vibration, Mechanical properties, Stresses, Magnetic fields.
Identifiers: Mohole project, Drill pipes.

Contents: Platform drill pipe sonde; Riser casing sonde; New drill pipe and new riser casing inspection; Threads; Recording instruments; Pipe identification rings on I. D. of box; Card punch and logic instrumentation; Literature survey and report. (Author)
PB-175 161 HC$3.00 MF$0.65

NESCO PROGRESS REPORT TO AUGUST 31 1964 (FIVE REPORTS).
Project MOHOLE scientific and technical progress for the period ending 15 Sep 64.
National Engineering Science Co., Houston, Tex.
14 Sep 64, 173p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Mathematical analysis, Loading (Mechanics), Dynamics, Motion, Buoys, Equations of motion, Numerical analysis.
Identifiers: Mohole project, Casing.

Contents: Covering letters and summary; Current structure - preliminary report on oceanographic considerations; Analysis for static loading conditions (beam/catenary equations - addenda to earlier work, a finite difference technique); Analysis for dynamic loading conditions (comparison of method of characteristics and finite difference method for dynamic analysis of riser, 'dynamic stresses in the Mohole riser', analysis by modal approach, vertical motion of variable displacement buoy under wave action); Numerical analysis.
PB-175 162 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING SEPTEMBER 15, 1964.
General Motors Corp., Dayton, Ohio. Inland Mfg. Div.
23 Sep 64, 10p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Coatings, Tests), Epoxy plastics, Asphalt, Buoyancy, Creep, Tensile properties, Hardness, Tables.
Identifiers: Mohole project.

The testing of the epoxy-asphalt coating material has been completed. The creep test at Southwest Research Institute, San Antonio, Texas, is progressing nicely. After about 10 days, the buoyancy loss of the five (5) specimens stabilized and has remained unchanged during the subsequent 50 days of immersion at 12,000 psi. The creep test data are presented in graphical form. (Author)
PB-175 163 HC$3.00 MF$0.65

MUD SAMPLES FOR 'COULTER-COUNTER ANALYSIS'.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 64.
Brown and Root, Inc., Houston, Tex.
15 Sep 64, 6p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Mud, Particle size), Liquids, Electrical conductance, Resistance (Electrical), Electrolytes, Sensitivity, Accuracy, Sampling, Measurement, Oscilloscopes, Pulse amplifiers, Voltage.
Identifiers: Mohole project.

The method determines the number and size of particles suspended in an electrically conductive liquid. The suspension flows through a small aperture having an immersed electrode on either side, with particle concentration such that the particles traverse the aperture substantially one at a time. Each particle passage displaces electrolyte within the aperture, momentarily changing the resistance between the electrodes and producing a voltage pulse of magnitude proportional to particle volume. The resultant series of pulses is electronically amplified, scaled and counted. The voltage pulses are displayed on the oscilloscope screen as a pattern of vertical 'spikes.' The pulse pattern serves as a guide for measurement and as a monitor of instrument performance. The pulses are also fed to a threshold circuit having an adjustable screen-out voltage level, and those pulses which reach or exceed this level are counted. Threshold level is indicated on the screen by a brightening of pulse segments above the threshold level. (Author)
PB-175 164 HC$3.00 MF$0.65

DEVELOPMENT OF DRILLING FLUID FRICTION ADDITIVES FOR PROJECT MOHOLE.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 64.
Pan American Petroleum Corp., Tulsa, Okla.
1964, 7p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Drilling machines, Drills, Friction, Additives, Marine geology, Floating bodies, Wear resistance, Skin friction, Sea water.
Identifiers: Mohole project.

The work done by Pan American to develop a fluid friction additive for the Mohole Project was in three main parts: (1) investigation of published literature, (2) testing, (3) evaluation of data. The equipment that was used for testing, the evaluation of the data obtained and final recommendations based on the data, all appear to be valid. The materials tested were evaluated in either fresh water or sea water, with the emphasis on sea water.
PB-175 165 HC$3.00 MF$0.65

SUBCONTRACTS SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 64.

Brown and Root, Inc., Houston, Tex.
31 Aug 64, 10p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Scheduling, Research program administration, Costs, Design, Procurement.
Identifiers: Mohole project.

Summary reports of subcontracts dated 31 August 1964 are listed.
PB-175 166 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING OCTOBER 15, 1964: SUMMARY AND SCIENCE SECTION.
Brown and Root, Inc., Houston, Tex.
31 Oct 64, 152p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Geophysical prospecting, *Site selection), Ocean currents, Wind, Marine meteorology, Atlantic Ocean, Pacific Ocean, Ships, Floats, Specifications, Ship hulls, Marine engineering, Design, Position finding, Marine propulsion, Hoists.
Identifiers: Mohole project.

Three design current profiles were developed separately and made into a composite graph. The platform preliminary design was reviewed and the contract plans and specifications were developed. Arrangement of most of the spaces in the upper and lower hulls is discussed. The interior arrangement of the columns remains to be worked out in detail. Plans showed the deck houses, pilot house, and upper hull to have scantlings considerably heavier than those normally found on offshore drilling rigs. Input data were developed for the three-dimensional computer program by which the platform stress could be determined. The crew's quarters and laboratory area arrangements are substantially complete. The design of the positioning units was considered to require additional development, particularly in the mechanisms for latching, sealing, and in the technique of handling. Purchase specifications for the main propulsion system package are being prepared. The propulsion motors will be two double-armature type, each capable of supplying 7,500 hp at full load. A study was made of platform crane requirements. The major function of the material handling cranes will be to transfer supplies, equipment, and personnel between the supply ship and the drilling platform. In response to the shipyard facilities survey, replies were received from 22 shipyards; eight requested to be omitted from consideration, five furnished complete information.
PB-175 167 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING OCTOBER 15, 1964, NAVAL ARCHITECTURE, MARINE ENGINEERING AND INSTRUMENTATION SECTION.
Brown and Root, Inc., Houston, Tex.
30 Oct 64, 19p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Specifications, Structural properties, Design, Ships, Propellers (Marine), Marine propulsion, Communication systems, Navigation, Floats, Marine engineering, Instrumentation, Hoists, Shipyards.
Identifiers: Mohole project, Drilling vessels.

Contents: Contract plans and specifications; Structural design; Arrangement; Machinery and ship's service systems; Positioning units; Vessel positioning system; Propulsion system; Communications and navigation; Platform cranes; Shipyard facilities survey.
PB-175 168 HC$3.00 MF$0.65

FLOATING DRILLING PLATFORM STATUS REPORT ON PRELIMINARY DESIGN (PHASE A) AND CONTRACT PLANS AND SPECIFICATIONS (PHASE B) ON PROJECT MOHOLE.
Progress rept. no. 16, 14 Sep-18 Sep 64.
Gibbs and Cox, Inc., New York.
P. H. Hadley, Jr. 18 Sep 64, 26p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ships, Design), Drilling machines, Floats, Ship hulls, Model tests, Stresses, Human engineering, Marine engineering, Ventilation, Heating, Air conditioning equipment, Power, Marine propulsion, Control systems, Pipes, Wastes (Sanitary engineering), Disposal.
Identifiers: Mohole project, Drilling vessels.

Contents: General arrangements; Naval architecture; Stress analysis; Arrangements; Ventilation, heating and air conditioning; Hull engineering installations; Main power plant; Positioning control systems and positioning units; Ship service generating plant; Piping systems; Waste disposal.
PB-175 169 HC$3.00 MF$0.65

MACHINERY REPORT ON WASTE DISPOSAL SYSTEM.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 64,
Gibbs and Cox, Inc., New York.
A. W. Freund, and C. J. Altenburg. 18 Sep 64, 31p Rept. no. M64-46
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Incinerators, Wastes (Sanitary engineering)), (*Wastes (Sanitary engineering), Disposal), Economics, Ships, Drilling.
Identifiers: Mohole project.

A study made of the disposal of all burnable rubbish concludes that if an incinerator is desired, then the capacity of this unit should be about 120 pounds per hour. It recommended that when considering all the facts, including maintenance and operation of equipment, manning to operate the equipment, fire hazards involved, housekeeping, weight and cost, that a baling machine be installed and all bales of rubbish be disposed ashore or at a distant point at sea via the supply vessel. (Author)
PB-175 170 HC$3.00 MF$0.65

POSITIONING SYSTEM.
Technical memo.
Honeywell, Inc., Hopkins, Minn.
1 Oct 64, 35p TM-6148-P-01
Contract NSF-C-260
Rept. on Project MOHOLE scientific and technical progress for the period ending 15 Oct 64, revised ed.

Descriptors: (*Well logging, Feasibility studies), (*Propellers (Marine), Vibration), Accuracy, Hydrophones, Marine propulsion, Buoys, Floats, Ships.
Identifiers: Mohole project, Drilling vessels.

The memorandum reviews existing data on the magnitude of the phase jitter expected to be encountered by the PCPS, determines the effect of this jitter on the positioning accuracy of the system, and considers the requirement for additional experiments. The largest observed value of phase jitter is 25 microseconds, resulting in a positioning CEP of 35 feet, and there exists substantial evidence indicating that the probable value is less than 15 microseconds. In view of the lack of any evidence that the magnitude of phase jitter will be sufficient to cause serious degradation of the PCPS performance, additional experiments cannot be justified. (Author)
PB-175 171 HC$3.00 MF$0.65

SPECIFICATIONS - PROPULSION MOTORS.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 64.
Brown and Root, Inc., Houston, Tex.
30 Sep 67, 32p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Marine propulsion, Electric motors), Diesel engines, Specifications, Control systems, Propellers (Marine).
Identifiers: Mohole project.

Specifications are listed for the propulsion motors and the diesel driven generators which power the motors.
PB-175 172 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING OCTOBER 15, 1964, DRILLING PLATFORM CRANE REQUIREMENTS.
Brown and Root, Inc., Houston, Tex.
Sep 64, 9p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Hoists, Handling), Floating bodies, Drilling, Design.
Identifiers: Drilling vessels, Mohole project.

Contents: Analysis of load requirements; Crane Locations; Operating radii and boom lengths required; Type of crane most suitable (general materials and supply handling, positioning unit handling, heavy lift requirements, personnel handling); Operating environmental factors (platform reaction to heavy crane loads and gantry crane travel, dynamic and shock loading); Crane design requirements (lifting capacities, function requirements, main and auxiliary hoist drum cable capacities, boom and rigging, crane support gantry design and travel features, type of power, safety features).
PB-175 173 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING OCTOBER 15, 1964, DRILLING SECTION.
Brown and Root, Inc., Houston, Tex.
15 Oct 64, 60p
Contract NSF-C-260
See also PB-175 195.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, GEOPHYSICAL PROSPECTING), Structures, Drilling, Hoists, Couplings, Pipes, Seals, Stresses, Supports, Buoys, Underwater equipment, Drills, Operators (Personnel), Performance (Engineering).
Identifiers: Mohole project.

Contents: Derrick and substructure; Hoisting system; Rotating equipment; Drill pipe; Riser system; Riser support system; Diving equipment; Downhole drills; Drilling crew for Mohole vessel; Equipment evaluation test program.
PB-175 174 HC$3.00 MF$0.65

DESIGN AND PROCUREMENT OF CONVENTIONAL TYPE DRAWWORKS.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 64,
National Supply Co., Torrance, Calif.
V. L. Lundeen. 15 Oct 64, 12p
Contract NSF-C-260
See also PB-167 149.

Descriptors: (*Well logging, Feasibility studies), (*Hoists, Drilling machines), Drilling, Design, Mechanical drawings, Brakes, Clutches.
Identifiers: Mohole project.

Installation layouts for the eddy current and hydromatic brakes, and design layouts for an overrunning clutch for the hydromatic brake are presented. Design studies are continuing on the drum

brake mechanism, brake remote control system and design of various drawworks shafts.
PB-175 175 HC$3.00 MF$0.65

CORROSION FATIGUE STUDIES.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 64.
Battelle Memorial Inst., Columbus, Ohio.
16 Oct 64, 26p
Contract NSF-C-260
See also PB-175 160.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Corrosion, Steel, Crack propagation, Stresses, Zinc coatings, Sea water, Experimental data.
Identifiers: Mohole project, Drill pipes.

A report is made of corrosion fatigue studies, residual static strength tests, crack propagation tests on S-135 steel.
PB-175 176 HC$3.00 MF$0.65

CUMULATIVE FATIGUE DAMAGE ASSESSMENT.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 64.
Curtiss-Wright Corp., Caldwell, N. J. Curtiss Div.
7 Oct 64, 14p
Contract NSF-C-260
See also PB-175 197

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Bending, Torsion, Air, Sea water, Stresses, Cracks, Experimental data.
Identifiers: Mohole project, Drill pipes.

A report is made of fatigue strength and axial fatigue tests on S-135 drill pipe.
PB-175 177 HC$3.00 MF$0.65

THE FATIGUE ANALYSIS OF THE MOHOLE DRILL PIPE, AND ASSOCIATED PROBLEMS.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 64,
Curtiss-Wright Corp., Caldwell, N. J.
F. B. Stulen. 1 Oct 64, 91p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Steel, Stresses, Corrosion, Mathematical analysis.
Identifiers: Mohole project, Drill pipes.

The report covers technical problems on the fatigue analysis of the drill pipe and related areas.
PB-175 178 HC$3.00 MF$0.65

LETTER REPORTS ON FATIGUE MACHINE.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 64,
Illinois Univ., Urbana. Dept. of Civil Engineering.
W. H. Munse. Sep 64, 12p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), (*Test equipment, *Fatigue (Mechanics)), Design, Stresses, Performance (Engineering).
Identifiers: Mohole project, Drill pipes.

Three letter reports regarding the design of a proposed drillpipe endurance testing machine for Project Mohole - Phase II are presented.
PB-175 179 HC$3.00 MF$0.65

INHIBITOR FOR AERATED SEA WATER--MOHOLE.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 64,
Pan American Petroleum Corp., Tulsa, Okla. Research Dept.
A. W. Garst. 3 Sep 64, 30p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Corrosion inhibition), (*Corrosion inhibition, Materials), Sea water, Corrosion, Fatigue (Mechanics), Drilling machines, Floating bodies, Marine geology, Effectiveness.
Identifiers: Mohole project.

The original test program designed to find at least one inhibitor effective in minimizing corrosion fatigue at temperatures of 200 degrees F. and 400 degrees F. has been successfully completed. Inhibitors were screened by bending a test specimen back and forth while exposed to inhibited or uninhibited synthetic sea water as indicated in the tables of data. The specimen was bent back and forth at the rate of 50 cycles per minute with the maximum stress adjusted to approximately 90,000 psi. At 200 degrees F., only a soluble oil type sold as Weilmuenster 1210 Liquid Phase Concentrate was found effective in increasing the number of stress cycles required to break the specimen in air saturated sea water. An increase of approximately 75% was achieved with this command.
PB-175 180 HC$3.00 MF$0.65

MOHOLE RISER DYNAMIC STRESS ANALYSIS.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 64,
National Engineering Science Co., Houston, Tex.
Arnold E. Galef. 8 Oct 64, 41p
Contract NSF-C-260
See also PB-175 200.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Drilling, Dynamics, Drag, Loading (Mechanics), Buoys, Supports, Statics.
Identifiers: Mohole project, Casing.

Investigations of current profiles at proposed drilling sites are continuing. However, some calculations are indicating that the riser stresses are much less dependent upon current than on platform position and roll or pitch angle; thus, accurate knowledge of the current profile may not be necessary. Calculations on the optimum distribution of passive buoys show that linear scaling will allow determination of the desired buoy configuration for a 40' or other buoy spacing, provided the buoy configuration for a 45' spacing is known. It was found that a finite difference solution to the statics problem, using a 4 foot interval in regions where bending is expected to be important and a 60 foot interval in other regions, gives accurate results over the entire riser. The static analysis completed to date has indicated that heavier riser pipe will be required at the attachment to the landing base up to approximately 100 feet above the base. A dynamics program for two-dimensional analysis utilizing the finite difference formulation has been written and is being checked for simple cases where an analytic solution is available, with apparently good results. The formulation of the dynamics problem assumes that the dominant wave-caused forces on the system are the inertia force on the large variable displacement buoy, and tth time-dependent roll and pitch of the platform. The wave forces on the remainder of the riser appear to be trivial in comparison to these and are being neglected. This simplifies the problem to a marked degree.
PB-175 181 HC$3.00 MF$0.65

THE UPPER RISER SUSPENSION AND TENSIONING SYSTEM.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 64.
Brown and Root, Inc., Houston, Tex.
1964, 7p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Supports), Hydraulic systems, Drilling.
Identifiers: Mohole project.

The report describes the upper riser suspension and tensioning system composed of the following: hydrosphere mount, stand counter, hydraulic slip joint, triservice hydraulic power system, hydroelectric collector, heave measuring and recording system, riser rotation indicating system and ship-to-riser position indicator and autopilot.
PB-175 182 HC$3.00 MF$0.65

TEST REPORT ON TOOL JOINT SEALS.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 64.
Noble (Wiley) and Associates, Houston, Tex.
14 Oct 64, 9p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Seals, *Couplings), Pipes, Drilling, Halocarbon plastics, Rubber seals, Hydrostatic tests.
Identifiers: Mohole project, Tool joints.

The 1/16 inch Teflon plugs used in the crest and root of a 5 1/2 FH Tool Joint Pin Thread did not perform satisfactorily. A standard 4 inch Weco seal as used in a 4 inch Weco Union was installed in a 5 1/2 API FH Tool Joint. It withstood a 10,000 psi pressure (using water) for 7 days. This type of seal is a satisfactory End Seal for any Mohole tool joints.
PB-175 183 HC$3.00 MF$0.65

EVALUATION OF UNDERWATER VEHICLES.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 64,
Brown and Root, Inc., Houston, Tex.
W. F. Walker. 21 Sep 64, 13p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Underwater vehicles, Feasibility studies), Pipes, Drilling machines, Operation, Ocean bottom, Marine geology, Manned, Submarines.
Identifiers: Mohole project, Evaluation.

Requirements of basic Mohole program are discussed as follows: re-entry with drill pipe; re-entry with logging sondes; replacement of riser casing; performance of salvage operations; observation of landing base installation; investigation of selected site; inspection of riser casing. Availability of underwater vehicles is discussed; examples are given of vehicles selected as most adaptable to Mohole application.
PB-175 184 HC$3.00 MF$0.65

EQUIPMENT EVALUATION TEST WELL DAILY DRILLING REPORTS.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 64.
Brown and Root, Inc., Houston, Tex.
1964, 84p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, *Machine tools), Roads, Rain, Water, Costs, Electricity, Telephone communication systems, Cutting tools, Welding.
Identifiers: Mohole project.

Contains detailed information of daily operations at equipment evaluation test well number 1.
PB-175 185 HC$3.00 MF$0.65

SCHEDULING SECTION, SUBCONTRACTS SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 64.
Brown and Root, Inc., Houston, Tex.
1964, 25p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Scheduling, Research program administration, Costs, Design, Procurement.
Identifiers: Mohole project.

Summary reports of subcontracts dated 30 September 1964 are listed.
PB-175 186 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING NOVEMBER 15, 1964, SUMMARY.
Brown and Root, Inc., Houston, Tex.
30 Nov 64, 11p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Specifications), Gravity, Magnetic properties, Velocity, Instrumentation, Density, Hardness, Reflection, Magnetic fields, Refraction, Pipes, Sea water.
Identifiers: Mohole project.

The Woods Hole Oceanographic Institute vessel, R. V. CHAIN, completed a gravity and magnetic survey of the area. At present these data are being evaluated and interpreted. Reflection and refraction shooting commenced November 6 by Offshore Exploration Group. Interpretive results of these surveys will be submitted in future Scientific and Technical Progress Reports. The scientific portion of the work being conducted in the equipment evaluation test well drilling at Uvalde, Texas is continuing and will be reported in detail later. Core measurements of acoustic velocity, density, hardness, gamma radiation, and electrical resistivity are being made and intermediate depth electrical, radiation, density, caliper and acoustic velocity logs have been run. Plans for the design and placement of a control center for the automatic pipe racker aboard the Mohole vessel have been completed. In the area of research and development of drill pipe, the final report on Subcontract 63-33 has been received from Battelle and evaluation of these data is currently in progress. (Author)
PB-175 187 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING NOVEMBER 15, 1964, NAVAL ARCHITECTURE, MARINE ENGINEERING, AND INSTRUMENTATION SECTION.
Brown and Root, Inc., Houston, Tex.
30 Nov 64, 18p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Hydrodynamics, Model tests, Hoists, Propellers (Marine), Marine propulsion, Power, Electric motors, Communication systems, Navigation, Floats, Marine engineering, Instrumentation.
Identifiers: Mohole project, Drilling vessels.

Contents: Hydrodynamics and model tests; Positioning units; Ship positioning; Propulsion motors; Power generation; D-C motors, generators, and controls; Communications and navigation.
PB-175 188 HC$3.00 MF$0.65

EXTENSION OF MOHOLE PLATFORM FORCE AND MOTION STUDIES.
Project MOHOLE scientific and technical progress for the period ending 15 Nov 64,
General Electric Co., Schenectady, N. Y. Advanced Technology Labs.
J. A. Bain. 21 Oct 64, 41p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Hydrodynamics), Ocean waves, Force (Mechanics), Motion, Floats, Drilling machines.
Identifiers: Mohole project, Drilling vessels.
PB-175 189 HC$3.00 MF$0.65

PROPELLER DESIGN STUDIES ANALYSIS OF MODEL TESTS.
Project MOHOLE scientific and technical progress for the period ending 15 Nov 64.
Taggart (Robert) Inc., Fairfax, Va.
6 Nov 64, 28p RT-11701
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Propellers (Marine), Model tests), Marine propulsion, Predictions, Nozzles, Control systems, Analysis, Performance (Engineering).
Identifiers: Mohole project.

The report covers the work limited to two items of the contract work statement: (1) Analyze model tests results and prepare predictions of performance data for the propeller-nozzle combination over a range of speeds from 0 to 6 knots in the ahead direction and from 0 to 4 knots with the direction of motion at 0 to 90 degree angles to the propeller center-line; (2) Analyze model test results and prepare predictions of performance data for the propeller-nozzle combination over a range of speeds from 0 to 10 knots in the ahead direction and from 0 to 6 knots at motion headings of 0 to 20 degrees relative to the main shaft.
PB-175 190 HC$3.00 MF$0.65

ANALYTICAL FORCE AND MOTION STUDY. PROPELLER DESIGN AND MODEL TEST ANALYSIS.
Project MOHOLE scientific and technical progress for the period ending 15 Nov 64.
Brown and Root, Inc., Houston, Tex.
30 Nov 64, 10p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Hydrodynamics), (*Propellers (Marine), Design), Model tests, Cavitation, Nozzles, Specifications, Steering, Marine propulsion, Control systems, Force (Mechanics), Motion, Analysis, Floats, Drilling machines.
Identifiers: Mohole project, Drilling vessels.

An outline is given of the items to be designed and data analysis necessary.
PB-175 191 HC$3.00 MF$0.65

SPECTRAL ANALYSIS DATA: 1:100 SCALE PLATFORM MODEL TESTS AT STEVENS INSTITUTE, SERIES IV, JUNE 1964.
Project MOHOLE scientific and technical progress for the period ending 15 Nov 64.
Stevens Inst. of Technology, Hoboken, N. J.
30 Nov 64, 27p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Model tests), Fluid dynamic properties, Drilling machines, Floats, Ocean waves, Roll, Acceleration, Pitch (Motion).
Identifiers: Mohole project, Drilling vessels.

The report consists of hydrodynamic data in tabular and graphical form.
PB-175 192 HC$3.00 MF$0.65

SPECIFICATIONS FOR A-C AND D-C DIESEL GENERATING UNIT AND AUXILIARY EQUIPMENT.
Project MOHOLE scientific and technical progress for the period ending 15 Nov 64.
Brown and Root, Inc., Houston, Tex.
30 Nov 64, 67p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Generators, Specifications), Engines + motors, Instruction manuals, Tachometers, Fuel oil, Mechanical drawings, Vibration, Bearings, Valves, Pumps, Lubrication, Safety, Pyrometers, Efficiency, Steel.
Identifiers: Project mohole.

These specifications cover the provision of 3 diesel generating units each having a capacity of 1,500 kw at 0.8 PF, complete with generator, exciter, accessories and auxiliary equipment, all mounted and piped on a suitable fabricated steel subbase. Exhaust silencers, surge tanks and certain instruments will be mounted by others though furnished with engine. Assembled units shall be fitted with suitable pads and/or lifting eyes to facilitate handling. Lifting gear may be detachable. The engine-generator package with all attached auxiliaries and subbase, shall be designed and assembled to permit hoisting and setting aboard the vessel. (Author)
PB-175 193 HC$3.00 MF$0.65

DEEP OCEAN-LONG LIFE TRANSPONDER (PROTOTYPE); GENERAL REQUIREMENTS FOR PLATFORM-MOUNTED EQUIPMENT SHORT BASELINE PLATFORM POSITION MEASUREMENT SYSTEM.
Project MOHOLE scientific and technical progress for the period ending 15 Nov 64.
GM Defense Research Labs., Santa Barbara, Calif.
27 Oct 64, 29p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ships, Specifications), Transponders, Position finding, Measurement, Design, Selection, Packaging, Underwater equipment.
Identifiers: Mohole project, Drilling vessels.

The specification defines the requirements for design, fabrication and selection of equipment to be provided as parts of the Project Mohole short baseline platform position measurement system. The specification describes the conditions within which the equipment must perform its design function, provides a guide to the selection of parts, outlines the testing which may be necessary to assure proper performance, describes the limitations on weight, size and packaging configurations, and indicates the preparation, labeling and packaging necessary for identification, operation and shipping. A transponder is described as part of the measurement system. (Author)
PB-175 194 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress rept. for 15 Nov 64.
Brown and Root, Inc., Houston, Tex.
15 Nov 64, 54p
Contract NSF-C-260
See also PB-175 211.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Hoists, Positioning devices (Machinery), Pipes, Couplings, Supports, Underwater equipment, Underwater vehicles, Performance (Engineering).
Identifiers: Mohole project.

Contents: Hoisting equipment; Pipe handling; Rotating system; Drill pipe; Riser system; Riser support system; Diving equipment; Equipment evaluation test well.
PB-175 195 HC$3.00 MF$0.65

A STUDY OF FATIGUE AND OTHER RELATED PROBLEMS ASSOCIATED WITH DRILL PIPE AND CASING MATERIALS FOR PROJECT MOHOLE.
Summary rept. no. 2, 15 Nov 64,
Battelle Memorial Inst., Columbus, Ohio.
David W. Hoeppner, Thomas P. Greeneveld, Arthur C. Koppenhafer, Walter S. Hyler, and Arthur R. Elsea. 6 Nov 64, 136p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Steel, Cathodic protection, Zinc coatings, Corrosion, Hydrogen, Crack propagation, Fracture (Mechanics).
Identifiers: Mohole project, Drill pipes, Casing.

The results of further evaluation of materials for the drill string to be used in Project Mohole are

presented in this report. These studies were carried out on 135 type heat treated drill pipe supplied by three producers. Included in these studies were experiments on effects of cathodic protection and sacrificial metal coatings to minimize the corrosion fatigue problem, evaluation of potential problems that may arise from hydrogen that can permeate the drill pipe with the use of such protection systems, establishment of specification requirements for impact characteristics of the drill pipe steel, evaluation of the crack propagation and residual strength of the 135 type steel. The corrosion fatigue strength of 135 type steel in sea water can be improved by the use of cathodic protection and with the use of a sacrificial zinc coating. However, with both protection systems hydrogen will be released at the drill pipe. Experiments showed that the 135 type steel is susceptible to hydrogen-induced delayed fracture, if the hydrogen enters the steel. However, experiments in sea water have not resulted in any failures; hence, this appears only as a potential problem. On the basis of Charpy tests and drop weight tear test results, recommendations are made for the steel drill pipe specification for impact strength. Crack propagation studies have shown that rates are high at certain of the stress levels evaluated. Values of constants in propagation rate equations are presented that can be used in a cumulative damage computation. The limited residual strength studies demonstrate that the 135 type steel is relatively tough; however, further evaluation has been suggested. (Author)

PB-175 196 HC$3.00 MF$0.65

CUMULATIVE FATIGUE DAMAGE ASSESSMENT.

Project MOHOLE scientific and technical progress rept. for 15 Nov 64.
Curtiss-Wright Corp., Caldwell, N. J. Curtiss Div.
15 Nov 64, 10p
Contract NSF-C-260
See also PB-175 198.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Stresses, Cracks, Experimental data.
Identifiers: Mohole project, Drill pipes.

A report is made of axial fatigue tests on S-135 drill pipe.

PB-175 197 HC$3.00 MF$0.65

MULTI-AXIAL FATIGUE FACTOR FOR MOHOLE DRILL PIPE.

Project MOHOLE scientific and technical progress rept. for 15 Nov 64,
Curtiss-Wright Corp., Caldwell, N. J. Curtiss Div.
W. C. Schulte, and F. B. Stulen. 9 Nov 64, 32p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Stresses, Air, Sea water, Experimental data, Bending, Torsion, Steel.
Identifiers: Mohole project, Drill pipes.

The results of the tests performed in air using the S-135 material indicate that lambda is approximately .98 - .89. This value differs somewhat from that obtained on similar strength steels reported by other investigators, wherein values of the order of .65 - .75 are usually shown. It may be that this difference is the result of directional properties of the pipe caused by the method of manufacture. The directional working of the material would result in a favorable grain flow for bending and axial fatigue, and a less favorable grain flow for torsional fatigue. Unfortunately, the size of the pipe from which the specimens were obtained would make it difficult to obtain specimens of different orientation to verify this hypothesis. The data obtained from the tests in air also indicate that the value of lambda may be only slightly affected by the number of cycles of the test. Other investigators have reported similar results. It would appear that the value of lambda decreases slightly with increasing number of cycles. The tests show that the value of lambda decreases markedly when corrosive conditions are encountered, and also show that the value of lambda decreases slightly with increasing number of cucles. Gough and McAdams attribute the lowering of fatigue strength by corrosion to the pitting and notching effect of corrosion, and the results reported in Reference 1 show that notched tests have lower value of lambda than smooth tests, hence these results are substantially in agreement with previous data. (Author)

PB-175 198 HC$3.00 MF$0.65

PROJECT MOHOLE PROGRESS REPORT, OCTOBER 1 TO NOVEMBER 1, 1964.

Scientific and technical progress rept. for 15 Nov 64.
AMF Tuboscope, Inc., Houston, Tex.
15 Nov 64, 6p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Non-destructive testing, *Pipes), Design, Rings, Specifications, Electronic equipment, Instrumentation, Recording systems, Electric cables, Circuits.
Identifiers: Mohole project, Drill pipes.

Contents: Platform drill pipe sonde; Riser casing sonde; New drill pipe and new riser casing inspection; Threads; Recording instruments; Pipe identification rings on inside diameter of box; Card punch and logic instrument; Literature survey and report. (Author)

PB-175 199 HC$3.00 MF$0.65

MOHOLE RISER STRESS ANALYSIS PROGRAM.

Project MOHOLE scientific and technical progress rept. for 15 Nov 64.
National Engineering Science Co., Houston, Tex.
15 Nov 64, 64p
Contract NSF-C-260
See also PB-175 216.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Drilling, Dynamics, Equations of motion, Statics, Graphics, Shear stresses, Moments.
Identifiers: Mohole project, Casing.

A summary of most severe moments and shear loads for the various configurations is presented. Graphical plots of results is given.

PB-175 200 HC$3.00 MF$0.65

STABILITY ANALYSIS FOR THE DYNAMIC SOLUTION OF THE MOHOLE RISER PROBLEM (TWO- OR THREE-DIMENSIONAL).

Project MOHOLE scientific and technical progress rept. for 15 Nov 64,
National Engineering Science Co., Houston, Tex.
H. Lee Butler. 5 Nov 64, 70p SN-183
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Hydrodynamics, Ocean currents, Ocean waves, Configuration, Motion, Floats, Drilling, Mathematical analysis, Equations of motion.
Identifiers: Mohole project, Casing.

The purpose of the study is to assess the dynamic stresses that are expected to occur in the Mohole riser as the result of current and wave action, of wave or wind-induced platform motions, and of platform maneuvering. The analysis is to be made for all riser configurations which can be expected to be critical. Configuration in this context is defined as the combination of descriptive parameters defining the geometry, the support constraints, and the excitation acting on the system. A schedule of configurations to be analyzed is given. (Author)

PB175 201 HC$3.00 MF$0.65

PRELIMINARY STUDY OF RIGID VARIABLE DISPLACEMENT BUOY DISCHARGE ORIFICES.

Project MOHOLE scientific and technical progress rept. for 15 Nov 64.
Brown and Root, Inc., Houston, Tex.
15 Nov 64, 13p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Buoys, *Orifices), Fluid flow, Stresses, Structural shells, Design, Optimization, Floats.
Identifiers: Mohole project.

When considering the problem of selecting the optimum discharge orifice size it is seen that the flow rate through the orifice may be governed by varying the differential pressure in the buoy and the water discharge orifice diameter. Also, the differential pressure, controlled by the flow rate through the orifice, directly affects the stress level in the buoy structural shell. With specific reference to the flow rate of 40,000 pounds in 16 seconds, or 39 cfm, suggested by Westinghouse for the gas generator it may be determined by the use of graphs that a 12 inch diameter discharge line will be adequate. This size is within the capabilities of buoy construction; therefore, it is reasonable to assume, for the present, that this flow rate is practical. Before final design of the buoy the stresses resulting from the study must be combined with all other stresses which may be imposed on the buoy by the riser and the seaway. (Author)

PB-175 202 HC$3.00 MF$0.65

TESTING SYNTACTIC FOAM BUOYANCY MATERIALS.

Project MOHOLE final and technical progress rept. for 15 Nov 64.
General Motors Corp., Dayton, Ohio. Inland Mfg. Div.
15 Nov 64, 131p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Buoys, *Foams), (*Expanded plastics, Buoyancy), Phenolic plastics, Epoxy plastics, Glass, Liquid immersion tests, Antifouling coatings, Composite materials, Compressive properties, Density, Hydrostatic tests, Castings, Absorption (Physical), Fouling.
Identifiers: Mohole project.

The conclusions of the investigation are: (1) Using present quality control methods, the tolerance on the density of Inlyte 96 can be set at 44 plus or minus 1 lb/cu. ft. This conclusion is based on average densities of the largest test specimens, i.e., 1.75 inches diameter x 5.75 inches long cylinders, as the percent of error in calculating the densities of these specimens is minimized. (2) The physical properties of test specimens cut from various sections of a large casting are, on the whole, quite consistent. (3) The physical properties of test specimens cut from a number of large castings are consistent. (4) At 12,000 psi. hydrostatic pressure, which is equivalent to 18,000 feet of ocean depth x a 1.5 safety factor the net buoyancy change of Inlyte 96 stabilized in 7 to 15 days. No further change in buoyancy has been recorded during the subsequent 65 days. If the stabilization period is considered to be equivalent to the phenomenon of plastic creep, it may be concluded that large sections of Inlyte 96, coated or uncoated, will not increase more than 2% in weight, due to water absorption, or exceed a 2% change in volume for an immersion period of 3 years at an ocean depth of 18,000 feet. (5) There is no loss of compressive, shear, flexural and hydrostatic physical properties of Inlyte 96 at 34F. (6) Compressive and shear strengths of Inlyte 96 are lower at 130F than at 77F or 34F. (7) Epoxy-asphalt coated syntactic foam is significantly more water resistant than the uncoated material. (8) The epoxy-asphalt coating material appears to be quite similar to some types of silicone rubber in tear and tensile strength. (9) Syntactic foams to be utilized in areas and at

depths where marine plant and animal life are prevalent, should be coated with cupric or boron based anti-fouling paints. (10) A certain degree of care should be exercised so that large sections of Inlyte 96 are not exposed to high, pure impact stresses.
PB-175 203 HC$3.00 MF$0.65

EQUIPMENT EVALUATION TEST WELL NO. 1, DAILY DRILLING REPORTS.
Project MOHOLE scientific and technical progress rept. for 15 Nov 64.
Brown and Root, Inc., Houston, Tex.
15 Nov 64, 174p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Basalt, Recovery), Asphalt, Drilling machines, Diamonds, Hydraulic pressure pumps, Rock (Geology), Instrumentation, Failure (Mechanics), Maintenance.
Identifiers: Mohole project.

Discusses formation encountered during the evaluation run of the American Coldset bit. Also covers the evaluation program on the Williams diamond core bit.
PB-175 204 HC$3.00 MF$0.65

SUMMARY OF EQUIPMENT EVALUATION TEST PROGRAM UVALDE TEST SITE.
Project MOHOLE scientific and technical progress rept. for 15 Nov 64.
Brown and Root, Inc., Houston, Tex.
15 Nov 64, 9p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Basalt, Recovery), Density, Hardness, Asphalt, Cutting tools, Drilling, Failure (Mechanics), Plastic coatings, Fracture (Mechanics), Zinc coatings, Joints.
Identifiers: Mohole project.

A progress report of work accomplished Oct 11-Nov 14, 1964 and a summary of equipment evaluation at Uvalde, Texas.
PB-175 205 HC$3.00 MF$0.65

EQUIPMENT EVALUATION - PRELIMINARY REPORT ON 9 7/8-in. x 4 7/8-in. DIAMOND CORE BITS.
Project MOHOLE scientific and technical progress rept. for 15 Nov 64.
Brown and Root, Inc., Houston, Tex.
15 Nov 64, 48p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Penetration, Life expectancy, Basalt, Rock (Geology), Drilling machines, Cutting tools, Diamonds, Configuration.
Identifiers: Mohole project.

One 9-7/8 in. x 4-7/8 in. diamond coring bit was purchased from each of five well known manufacturers of this type equipment. The five bits were analogous in overall configuration but differed in such details as the number and size of diamonds, the arrangement of diamonds, water course design, matrix, etc.
PB-175 206 HC$3.00 MF$0.65

SCHEDULING SECTION AND SUBCONTRACTS SECTION.
Project MOHOLE scientific and technical progress rept. for 15 Nov 64.
Brown and Root, Inc., Houston, Tex.
31 Oct 64, 9p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Scheduling, Research program administration, Costs, Design, Procurement.
Identifiers: Mohole project.

Summary reports of subcontracts are listed along with a computer printout of the project schedule, dated October, 1964.
PB-175 207 HC$3.00 MF$0.65

SUMMARY.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 64.
Brown and Root, Inc., Houston, Tex.
31 Dec 64, 14p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Marine engineering, Drilling, Instrumentation, Marine propulsion, Propellers (Marine), Power, Drilling machines, Buoys, Drills.
Identifiers: Mohole project.

Contents: Science; Naval architecture, marine engineering, and instrumentation; Drilling engineering.
PB-175 208 HC$3.00 MF$0.65

SCIENCE SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 64.
Brown and Root, Inc., Houston, Tex.
1964, 13p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Laboratories, Shipborne), Instrumentation, Handling, Biological laboratories, Electronics laboratories, Oceanology, Petrography, Paleontology, Test facilities, Marine geology, Photography, Storage.
Identifiers: Mohole project.

The drilling vessel scientific laboratories include: General facilities; Logging facilities; Core handling area; Sonde handling; Laboratory work space; Biological laboratory and sterile room; Instrument repair laboratory; Oceanographic laboratory and sterile room; Paleontological laboratory; Petrographic laboratory; Physical test laboratory; Shielded electronic laboratory; Photographic processing; and Laboratory administration and storage.
PB-175 209 HC$3.00 MF$0.65

NAVAL ARCHITECTURE, MARINE ENGINEERING, AND INSTRUMENTATION SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 64.
Brown and Root, Inc., Houston, Tex.
1964, 16p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Hydrodynamics, Model tests, Propellers (Marine), Marine propulsion, Power, Communication systems, Navigation, Marine engineering, Floats, Instrumentation.
Identifiers: Mohole project, Drilling vessels.

Contents: Hydrodynamics and model tests; Vessel positioning; Power generation and instrumentation; Communications and navigation.
PB-175 210 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 64.
Brown and Root, Inc., Houston, Tex.
1964, 41p
Contract NSF-C-260
See also PB-175 230.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Hoists, Drilling, Couplings, Pipes, Supports, Stresses, Buoys, Drills, Performance (Engineering).
Identifiers: Mohole project.

Contents: Hoisting system; Rotating system; Drill pipe; Riser system; Riser support system; Downhole drills; Equipment evaluation test well.
PB-175 211 HC$3.00 MF$0.65

DESIGN DATA CONVENTIONAL DRAWWORKS.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 64.
National Supply Div., Torrance, Calif.
1964, 96p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Hoists, Drilling machines), Drilling, Design, Mechanical drawings, Specifications, Clutches, Brakes, Drives.
Identifiers: Mohole project.

The design of a conventional drawworks is shown by the drawings and specifications contained in this report. The drawworks is 15 ft high x 20 ft 8 in. wide x 31 ft long and weighs approximately 160,000 lb without motors, controls, and auxiliary brake. The drum of the drawworks is 54 in. in diameter x 92 in. in length and is grooved for 1 3/4 in. diam drilling line. Four hoisting speeds are obtained by the incorporation of a two-speed transmission in combination with two drives to the drum shaft. The gear ratio selected for low drive provides the specified 1,000,000-lb hook load capacity at a constant speed of 90 feet per minute; this speed has sufficient torque multiplication to hoist 1,000,000-lb load with one of the four driving motors out of service. The four electric motors have a rating of 3,968 horsepower at 920 revolutions per minute. Both the high and low drum clutches are air-operated friction type; an integral manually operated jaw clutch is also provided for emergency use in the event of air supply failure. In addition to manual operation of the mechanical brake, a power system has also been provided that transmits to the driller a sense of feel of the amount of braking effect being accomplished. The force and motion applied to the brake by the power booster is proportional to the force and motion applied to the braking lever by the driller. An auxiliary brake of an electric or eddy current type will be installed on the drawworks. (Author)
PB-175 212 HC$3.00 MF$0.65

SWIVEL DESIGN DATA.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 64.
National Supply Div., Torrance, Calif.
30 Nov 64, 9p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Couplings, Supports), Design, Drilling, Mechanical drawings, Pipes, Rotary seals, Drilling machines, Rotation.
Identifiers: Mohole project.

The swivel is 4 ft 6 1/2 in. wide x 14 ft 5 in. long and weighs 10,000 lb. It is furnished with an adaptor type bail for use with conventional center-latch elevators, the combination of which will permit the passage of wireline and core barrel through the internal diameters of these units. The following criteria were specified in this design: a minimum inside diameter of 4 in., main bearing capability of 1,300 hours' operation at 200 rpm supporting a load of 400 tons, a static load capacity of 500 tons, a special gooseneck with a vertical connection to permit passage of wireline and tools through 4-in. ID, connection to permit installation of wireline blowout preventer, a rating of 5,000-psi continuous working pressure, a 'quick disconnect' between hook and swivel, capability of transmitting a static load of 1,000,000 lb, and free floating type washpipe. (Author)
PB-175 213 HC$3.00 MF$0.65

A STUDY OF FATIGUE AND OTHER RELATED PROBLEMS ASSOCIATED WITH DRILL PIPE AND CASING MATERIALS FOR PROJECT MOHOLE.

Summary rept.,
Battelle Memorial Inst., Columbus, Ohio.
David W. Hoeppner, Thomas P. Groenweld, Arthur C. Koppenhafer, Walter S. Hyler and Arthur R. Elsea. 6 Nov 64, 139p Rept. no. 2
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Corrosion, Cathodic protection, Zinc coatings, Corrosion inhibition, Coatings, Fracture (Mechanics), Crack propagation, Hydrogen embrittlement, Steel.
Identifiers: Mohole project, Casing, Drill pipes.

The results of further evaluation of materials for the drill string to be used in Project Mohole are presented in this report. These studies were carried out on 135 type heat treated drill pipe supplied by three producers. Included in these studies were experiments on effects of cathodic protection and sacrificial metal coatings to minimize the corrosion fatigue problem, evaluation of potential problems that may arise from hydrogen that can permeate the drill pipe with the use of such protection systems, establishment of specification requirements for impact characteristics of the drill pipe steel, evaluation of the crack propagation and residual strength of the 135 type steel. The corrosion fatigue strength of 135 type steel in sea water can be improved by the use of cathodic protection and with the use of a sacrificial zinc coating. However, with both protection systems hydrogen will be released at the drill pipe. Experiments showed that the 135 type steel is susceptible to hydrogen-induced delayed fracture, if the hydrogen enters the steel. However, experiments in sea water have not resulted in any failures; hence, this appears only as a potential problem. On the basis of Charpy tests and drop weight tear test results, recommendations are made for the steel drill pipe specification for impact strength. Crack propagation studies have shown that rates are high at certain of the stress levels evaluated. Values of constants in propagation rate equations are presented that can be used in a cumulative damage computation. The limited residual strength studies demonstrate that the 135 type steel is relatively tough; however, further evaluation has been suggested. (Author)
PB-175 214 HC$3.00 MF$0.65

CUMULATIVE FATIGUE DAMAGE ASSESSMENT.
Project MOHOLE progress rept.
Curtiss-Wright Corp., Caldwell, N. J. Curtiss Div.
7 Dec 64, 12p Rept. no. 8
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Steel, Drilling, Stresses, Cracks, Bending, Torsion.
Identifiers: Mohole project, Drill pipes.

A report is made on the assessment of cumulative fatigue damage for Mohole drill pipe. Because of the inherent shortcomings in small-scale fatigue testing, it was assumed that values calculated as a result of these completed tests would not be directly applicable for use in predicting fatigue damage; further, it was also assumed that modification of the test material would be made prior to actual purchase of the Mohole pipe. The important conclusions that can be drawn from the test results to date are that: (1) the multiaxial fatigue factor, as determined by small-scale tests, is found to differ from values that were expected in the low alloy, quenched and tempered steel tested; (2) the presence of a corrosive environment reduces the multiaxial fatigue factor by a significant amount; and (3) the multiaxial fatigue factor appears to decrease slowly with cycles applied. The sensitivity of the multiaxial fatigue factor to the above variables indicates the necessity for further tests, closely controlled to obtain quantitative data. (Author)
PB-175 215 HC$3.00 MF$0.65

RISER CASING STRESS ANALYSIS.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 64.
National Engineering Science Co., Houston, Tex.
21 Nov 64, 45p
Contract NSF-C-260
See also PB-175 200.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Statics, Dynamics, Drilling, Buoys, Supports.
Identifiers: Mohole project, Casing.

The high order bending stresses at the top of the riser predicted by both static and dynamic analyses in this study strongly indicate that the design of a workable riser system must be based on more realistic inputs. An examination of design parameters indicates now, as a result of oceanographic studies, improved knowledge of vessel motions, and later general design development, it is not unreasonable to revise certain inputs to the problem. The most significant changes in these inputs are a reduction in vessel repositioning velocities and a decrease in the value of the estimated maximum ocean current. Changes also are made in the upper riser buoy configuration, maximum mud weight, and the maximum vessel roll angle. Using the new input data, a limited number of static configurations have been re-examined and, as may be expected from earlier results, the changes in upper buoy configuration and design current profile have little effect (under static loading conditions) on moments and shear at top and bottom of the riser. The most significant effect at the top of the riser is the angle of roll of the vessel and, at the bottom, the displacement of the vessel off hole assumes the most importance. The results of the dynamic analysis indicate that stresses in the area of the upper riser may be kept within acceptable limits by the employment of suitable design details. It appears that a suitable design for the top connection may comprise a limited guide shoe together with one or more stress relieving measures such as a stiffer upper member, a partially pinned connection, or the use of a bridle.
PB-175 216 HC$3.00 MF$0.65

PROJECT MOHOLE PROGRESS REPORT TO BROWN AND ROOT, INC. NOVEMBER 1 TO DECEMBER 1, 1964.
AMF Tuboscope, Inc., Houston, Tex.
1964, 6p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Non-destructive testing, *Pipes), Design, Mechanical properties, Amplifiers, Mechanical drawings, Coils, Electronic equipment, Instrumentation, Electric connectors, Electric cables, Recording systems, Electric wire, Rings.
Identifiers: Mohole project, Drill pipes.

Contents: Drill pipe inspection sonde; Riser casing inspection sonde; New drill pipe and new riser casing inspection; Threads; Recording instruments; Pipe identification rings on inside diameter of box; Card punch and logic instrument; Literature survey and reports. (Author)
PB-175 217 HC$3.00 MF$0.65

STATIC AGING TEST.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 64.
General Motors Corp., Dayton, Ohio. Inland Manufacturing Div.
16 Nov 64, 11p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Foams, Buoys), (*Expanded plastics, Buoyancy), Creep, Aging (Materials), Phenolic plastics, Epoxy plastics, Antifouling coatings, Absorption (Physical), Water.
Identifiers: Mohole project.

The results and evaluation of creep tests on syntactic foam buoyancy materials carried out at research laboratories in Santa Barbara, California are presented. The purpose of these tests was to cross-check the data gathered in creep tests conducted at Southwest Research Institute in San Antonio. Buoyancy loss measurements made at SRI were obtained under a hydrostatic pressure of 12,000 psi, and the buoyancy loss measurements obtained at General Motors Defense Research Laboratories were taken at atmospheric pressure. The mechanics of water absorption are related to hydrobaric phenomena, and, for this reason, the measurements of water absorption and buoyancy loss obtained at atmospheric pressure would be greater than those obtained in a pressurized system. Tests were also conducted to determine the effectiveness of coating materials in decreasing marine fouling. After four months' immersion in salt water, the specimens coated with antifouling paint remained free of marine life while those coated with epoxy-asphalt and fluorescent paint were found to be contaminated with small- to medium-size barnacles and jelly-like organisms.
PB-175 218 HC$3.00 MF$0.65

PROTOTYPE RETRACTABLE CORE BIT HEAD AND BARRELS.
Project MOHOLE progress rept. 12 Oct-12 Nov 64,
Christensen Diamond Products Co., Salt Lake City, Utah.
H. C. Bridwell. 24 Nov 64, 19p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Reports), Diamonds, Reamers, Patents, Drafting.
Identifiers: Mohole project.

Design work on the development of a retractable diamond bit drilling system for the Mohole is underway. Patent and literature studies have been completed and present work consists of creating, sketching and drafting layouts of prospective retractable drill bit systems. (Author)
PB-175 219 HC$3.00 MF$0.65

EQUIPMENT EVALUATION TEST WELL.
Weekly summary.
Brown and Root, Inc., Houston, Tex.
1964, 212p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Cutting tools, Basalt, Recovery, Drilling machines, Diamonds, Gamma rays, Maintenance, Rock (Geology), Neutrons.
Identifiers: Mohole project.

Contains four weekly summaries of the equipment evaluation test program at Uvalde. Summaries are supported with detailed data of daily operations.
PB-175 220 HC$3.00 MF$0.65

SCHEDULING SECTION AND SUBCONTRACTS SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 64.
Brown and Root, Inc., Houston, Tex.
1964, 24p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Scheduling, Research program administration, Costs, Design, Procurement.
Identifiers: Mohole project.

A 3-page computer printout of activities is arranged in early start sequence. This excerpt, taken from the 'IJ' sequence printout dated December 1, 1964, was printed as a convenience in providing the scheduled dates for awarding subcontracts and major purchase orders. The companion document to a full 38-page computer printout dated December 1, 1964, represents the interrelationship of activities and sequencing of activities to reach major

events on the schedule for Phase II of Project Mohole.
PB-175 221 HC$3.00 MF$0.65

SCIENCE SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 65.
Brown and Root, Inc., Houston, Tex.
31 Jan 65, 19p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Geophysical prospecting, *Site selection), Marine engineering, Instrumentation, Drilling, Oceanology, Reflection, Refraction, Seismology, Sedimentation, Model tests, Thickness, Marine geology, Position finding, Power supplies, Stresses, Gas generating systems, Pipes, Buoys.
Identifiers: Mohole project.

The operations and interpretation of a combined reflection-refraction survey over the Hawaiian Arch are presented. The survey, conducted in the latter part of 1963, produced 567 miles of reflection and refraction coverage in a site area 65 by 45 nautical miles with its center lying approximately 120 miles north of Maui. The purpose of the survey was to determine the depth of the Mohorovicic discontinuity. The reflection survey revealed a thin veneer of sediments over what is thought to be basaltic basement. At a few locations, faint reflections could be seen at reflection times up to 1.5 seconds beneath the sea floor. It is not known if these reflections represent sediment or layering within basement. The refraction profiles produced results which were self-consistent and confirmed the indications of a prior survey. The mantle depth is indicated to vary from slightly over 12 km below sea level to as shallow as 9.2 km below sea level over the crest of the Hawaiian Arch in this area. One of the other areas selected for geophysical investigation, Barracuda Fault, was subjected to a reconnaissance seismic program to determine the crustal structure at this site. The results of this survey work, also conducted in 1963, are also included.
PB-175 222 HC$3.00 MF$0.65

SITE SURVEY. HAWAIIAN ARCH AREA.
Project MOHOLE final rept. 29 Sep 63-8 Nov 63.
Western Geophysical Co. of America, Los Angeles.
1964, 122p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Seismic waves, Mapping), Ocean bottom, Basalt, Sedimentation, Hawaii, Anomalies, Hydrophones, Reflectivity, Site selection, Ocean bottom topography.
Identifiers: Mohole project.

Western Geophysical Company conducted a combined reflection-refraction survey over the Hawaiian Arch during September, October and November, 1963, to produce 567 miles of reflection and refraction coverage. The reflection survey revealed a thin veneer of sediments over what is thought to be basaltic basement. At a few locations, faint reflections could be seen at reflection times up to 1.5 seconds beneath the sea floor. It is not known if these reflections represent sediment or layering within basement. Numerous volcanic cones dot the area of survey. Refraction profiles ranged from poor to good. Computed results were self-consistent and confirmed the results of a prior survey by Shor and Pollard (1964). Mantle depth varied from 12+ km below sea level to as little as 9.0 km below sea level over the crest of the Hawaiian Arch. Axis of the Arch at mantle depth is NW-SE, but the axis rotates counterclockwise with decreasing layer depths. A checkline (refraction) shot perpendicular to Shor's and Pollard's profiles 26-27 failed to reveal the presence of a mantle anomaly. (Author)
PB-175 223 HC$3.00 MF$0.65

REFLECTION SURVEY AT BARRACUDA FAULT.
Project NOHOLE scientific and technical progress for the period ending 15 Jan 65,
Western Geophysical Co. of America, Los Angeles, Calif.
L. Paitson, C. H. Savit, D. M. Blue, and W. A. Knox. 18 Nov 63, 13p
Contract NSF-C-260
Prepared for presentation in part at the Annual SEG Meeting (33rd), New Orlands, Louisiana, October 23, 1963. Geophysics v29 n6 p 941-950 Dec 1964.

Descriptors: (*Well logging, Feasibility studies), (*Seismology, Geophysical prospecting), (*Marine geology, Atlantic Ocean), Geological survey, Site selection, Sedimentation, Reflection, Faults (Geology).
Identifiers: Mohole project.

The paper presents the results of a reconnaissance survey conducted by Western Geophysical Company over the Barracuda Fault structure, which is located about 200 miles east of Guadeloupe Island in the West Indies. This was one of the areas selected for evaluation as a potential site for drilling through crust to mantle. The reflection profiling obtained as accessory data to crustal refraction profiles revealed 5.5 km of relief associated with this structure. As an aid to the refraction interpretation, reflection profiles were obtained on all refraction lines to provide accurate measurement of thickness of the two shallowest layers: water and sediment. The data obtained contained information of interest far beyond the primary purpose and are presented in this report with a minimum of interpretation, but in a form complete enough for the interested reader to effect his own interpretation. (Author)
PB-175 224 HC$3.00 MF$0.65

REPORT OF SEISMIC SURVEYS CONDUCTED BY OFFSHORE EXPLORATION GROUP. POSITIONING SYSTEM BY DECCA.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 65.
Brown and Root, Inc., Houston, Tex.
1964, 25p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), West Indies, Explosive materials, Position finding, Seismology, Celestial navigation.
Identifiers: Mohole project.

This is the report of a geophysical consultant who was retained by Brown and Root to supervise the detailed seismic operations conducted over the Barracuda Fault during October, November, and part of December, 1964. In general, the operations were hampered by shortcomings of the positioning system, but it is generally agreed that the shot points are located accurately within the limits of celestial navigation. Further checks of location were made through the use of bathymetric measurements, and while the accuracy achieved is not that which was planned, it is felt that the recovery of positions occupied is adequate for the purpose of the survey. All of the assigned refraction program and approximately half of the reflection program was completed.
PB-175 225 HC$3.00 MF$0.65

REPORT ON WIND AND WAVE STATISTICS FOR PROPOSED MOHOLE DRILLING SITES.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 65,
Brown and Root, Inc., Houston, Tex.
R. O. Reid. Dec 64, 129p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ocean waves, Wind), Atlantic Ocean, Pacific Ocean, Site selection, Drilling machines, Oceanology, Statistical analysis, Floating bodies, Marine geology.
Identifiers: Mohole project.

The sources of wind and wave information for the Atlantic site are presented. These sources give statistics based on ship observations over an extended period of years for selected regions of the North Atlantic. The information is presented in the following order: Wind statistics, speed and direction; Sea, heights and direction; Swell, heights and direction; Composite sea and swell, heights and periods; Joint distribution of heights and periods for composite sea and swell; Spectral considerations.
PB-175 226 HC$3.00 MF$0.65

NAVAL ARCHITECTURE, MARINE ENGINEERING, AND INSTRUMENTATION SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 65.
Brown and Root, Inc., Houston, Tex.
1965, 8p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Hydrodynamics, Model tests, Propellers (Marine), Marine propulsion, Power, Communication systems, Navigation, Marine engineering, Instrumentation.
Identifiers: Mohole project, Drilling vessels.

Contents: Hydrodynamics and model tests; Vessel positioning; Power generation; Communications and navigation.
PB-175 227 HC$3.00 MF$0.65

1:100 SCALE MODEL TESTS.
Project MOHOLE scientific and technical progress rept. for the period ending 15 Jan 65.
Stevens Inst. of Tech., Hoboken, N. J.
1965, 6p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Model tests), Motion, Ocean waves, Floats, Drilling machines, Fluid dynamic properties.
Identifiers: Mohole project, Drilling vessels.

The fifth series of 1:100 scale model tests was conducted at Stevens Institute of Technology to obtain additional information on platform motions at drilling draft. Test conditions included regular and irregular waves with heights from 7 to 23 ft prototype and platform headings of 0 and 90 degrees. The preliminary tabulations of the test data are presented. (Author)
PB-175 228 HC$3.00 MF$0.65

INTERFERENCE REJECTION CHARACTERISTICS OF THE SHORT BASELINE POSITION MEASUREMENT SYSTEM.
Project MOHOLE technical memo.,
GM Defense Research Labs., Santa Barbara, Calif.
T. Baker. 30 Dec 64, 25p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Interference, Reduction, Noise, Floats, Floating docks, Signals, Drilling, Hydrophones, Electric filters, Transponders, Pulse duration modulation.
Identifiers: Mohole project.

A memorandum which describes the design features incorporated into the short baseline position measurement system to reduce the possibility of interference from other systems or excessive noise bursts from the drilling platform. The interference rejection features incorporated into the short baseline system fall into three categories: band rejection filters, pulse duration verification circuitry, and pulse strength verification circuitry. These design features require that incoming pulses to the short baseline system transponder and platform hydorphones possess proper center frequency, proper pulse duration, and minimum signal strength for the proper pulse duration.
PB-175 229 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 65.
Battelle Memorial Inst., Columbus, Ohio.
1965, 53p
Contract NSF-C-260
See also PB-175 243.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Pipes, Drilling, Supports, Buoys, Drills, Performance (Engineering).
Identifiers: Mohole project.

Contents: Drill pipe; Riser system; Riser support system; Down-hole drills; Equipment evaluation test well.
PB-175 230 HC$3.00 MF$0.65

CUMULATIVE FATIGUE DAMAGE ASSESSMENT.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 65.
Curtiss-Wright Corp., Caldwell, N. J. Curtiss Div.
13 Jan 65, 6p
Contract NSF-C-260
See also PB-175 245.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Bending, Torsion, Sea water, Air, Steel, Tests.
Identifiers: Mohole project, Drill pipes.

The ninth progress report on the assessment of cumulative fatigue damage of drill pipe is presented. The testing in bending fatigue and torsion fatigue in sea water and in air and the axial fatigue testing in air has been completed and a final report issued.
PB-175 231 HC$3.00 MF$0.65

PROGRESS REPORT TO BROWN AND ROOT, INC. DECEMBER 1, 1964 TO JANUARY 1, 1965.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 65.
AMF Tuboscope, Inc., Houston, Tex.
1 Jan 65, 7p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Non-destructive testing, *Pipes), Design, Machining, Electronic equipment, Circuits, Signals, Electric wire, Coils, Control systems, Ultrasonic-properties, Transducers, Pneumatic devices, Tests.
Identifiers: Mohole project, Drill pipes.

The report concerns the design and development of equipment and techniques for nondestructive pipe inspection indicating the drill pipe sonde to be progressing to that point where demonstrations of the equipment are planned for February. The launcher assembly was constructed and given an initial mechanical check-out. Wiring was started on the control systems, cable drum assembly, and diesel power plant. Load and regulation tests were made on the console power supplies. In regard to the casing sonde, preliminary designs and detailed drawings have been completed on the expandable shoe assembly. The magnetic unit of the casing sonde was disassembled to permit additional machining. (Author)
PB-175 232 HC$3.00 MF$0.65

DYNAMIC STRESS ANALYSIS OF THE MOHOLE RISER SYSTEM.
Project MOHOLE final rept. Apr-Dec 64.
National Engineering Science Co., Pasadena, Calif.
29 Dec 64, 89p SN-183-2
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Drag, Loading (Mechanics), Motion, Damping, Ocean waves, Design, Drilling, Reynolds number, Mathematical analysis.
Identifiers: Mohole project, Casing.

The report summarizes the activities of the NESCO staff between April and December, 1964, in support of the design of the riser casing system. Methods for analyzing the motions and stresses in a very long beam under tension, with varying properties and loading along the length and with time variable boundary conditions, were developed and were applied in this feasibility investigation of the riser system. The analysis included these several factors: flexural rigidity along the entire length of the beam, square-law damping, with drag coefficient functions of local Reynolds number, excitations, and lastly, three-dimensional excitations and motions. The principal result of this analysis is a design of the riser system capable of withstanding the anticipated environment during the time that the Mohole is drilling. (Author)
PB-175 233 HC$3.00 MF$0.65

RISER BUOYANCY CONTROL SYSTEM.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 65.
Brown and Root, Inc., Houston, Tex.
1965, 41p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Buoyancy), (*Buoys, Supports), Compressed air, Nitrogen, Liquefied gases, Cryogenics, Storage, Gas flow, Marine geology, Heat, Vaporization, Graphics, Engines + motors, Drilling machines, Floating bodies.
Identifiers: Mohole project.

The report contains graphs to simplify the preliminary calculations for on board mechanical equipment required in the inflation of the variable displacement buoys of the riser support system. A dual inflation facility is proposed: for normal operation consideration is given to a compressed air system powered by electric, diesel, or air motor. The other system is an emergency inflation system that uses cryogenic nitrogen stored in Dewars on board the drilling vessel. In order to specify equipment and piping for these systems, it is necessary to determine the total quantity of gas required and the flow rate with which it must be supplied to the buoy. Additional information is needed for the nitrogen system in that the requirements of heat necessary to vaporize the liquified gas must be calculated. The methods of calculating these quantities by graphs are illustrated in the report.
PB-175 234 HC$3.00 MF$0.65

MEETING WITH WESTINGHOUSE. MOHOLE GAS GENERATOR.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 65.
Brown and Root, Inc., Houston, Tex.
1965, 18p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Gas generating systems, Underwater), (*Floats, Buoyancy), Jatos, Buoys, Coolants, Ammonia, Carbon dioxide, Valves, Firing circuits, Propellants, Materials, Pipes, Exhaust gases.
Identifiers: Mohole project.

The report is of the meeting with Westinghouse to discuss development work for the underwater gas generator. It was decided the present approach to completing the preliminary design for the gas generator is satisfactory, a complete coolant study will be required as part of the future program, and consideration should be given to other gas generators if required by the systems studied; i.e., CO_2 and NH_3 systems. A 400-ft operating depth also should be considered as one of the design parameters. Other design details were discussed and presented in the report.
PB-175 235 HC$3.00 MF$0.65

REPORT ON COMPOSITE STRUCTURES UTILIZING INLYTE BUOYANCY MATERIALS.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 65.
Brown and Root, Inc., Houston, Tex.
8 Jan 65, 11p
Contract NSF-C-260
See also PB-175 250.

Descriptors: (*Well logging, Feasibility studies), (*Composite materials, Hydrostatic tests), (*Expanded plastics, Hydrostatic tests), Buoyancy, Density, Volume, Absorption (Physical), Water, Glass, Spheres, Foams, Coatings, Cylindrical bodies, Buoys, Experimental data, Compressive properties.
Identifiers: Mohole project.

An investigation was conducted on composite structures utilizing Inlyte buoyancy materials. The object was to compare the strength of hollow Inlyte and a composite of Inlyte and large glass spheres with the strength of solid Inlyte. This report describes the testing procedures. (Author)
PB-175 236 HC$3.00 MF$0.65

HYDROSTATIC BUOYANCY CREEP TEST OF CERTAIN SYNTACTIC FOAMS.
Project MOHOLE final rept.,
General Motors Corp., Dayton, Ohio. Inland Manufacturing Div.
E. M. Briggs, and R. C. DeHart. 1 Dec 64, 23p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Expanded plastics, Buoyancy), Buoys, Foams, Hydrostatic tests, Creep.
Identifiers: Mohole project.

The report presents the results of the the long term hydrostatic buoyancy creep test of certain syntactic foams. Five specimens, two uncoated wedges and three coated cylinders, were hydrostatically tested at 11,600 psi for 101 days while the change of buoyancy was continuously monitored. (Author)
PB-175 237 HC$3.00 MF$0.65

RETRACTABLE DIAMOND CORE BIT AND BARREL. TRIP REPORT. CHRISTENSEN DIAMOND PRODUCTS COMPANY.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 65.
Brown and Root, Inc., Houston, Tex.
13 Jan 65, 8p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Reports), Diamonds, Pipes, Drills, Performance (Engineering), Design.
Identifiers: Mohole project.

The report is of a trip made by the staff to the Christensen Diamond Products Company facilities in line with their duties regarding the progress of Subcontract 64-68, the Design of a Retractable Diamond Core Bit and Barrel. The subcontractor has explored several concepts of the basic tool and an evaluation program for these concepts has been determined. (Author)
PB-175 238 HC$3.00 MF$0.65

SCHEDULING SECTION. SUBCONTRACTS SECTION.
Project MOHOLE scientific and technical progress for the period ending 31 Jan 65.
Brown and Root, Inc., Houston, Tex.
1965, 24p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Scheduling, Research program administration, Procurement.
Identifiers: Mohole project.

A 3-page computer printout of activities is arranged in early start sequence. This excerpt, taken from the 'IJ' sequence printout dated January 15, 1965, was printed as a convenience in providing the scheduled dates for awarding subcontracts and major purchase orders. The companion document to a full 38-page computer printout also dated January 15, 1965, represents the interrelationship of

activities and sequencing of activities to reach major events on the schedule for Phase II of Project Mohole.
PB-175 239 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING FEBRUARY 15, 1965, SUMMARY AND SCIENCE SECTIONS.
Brown and Root, Inc., Houston, Tex.
28 Feb 65, 44p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Marine engineering, Instrumentation, Drilling, Electric cables, Design, Tensiometers, Power supplies, Transponders, Navigational aids, Communication equipment, Model tests, Position finding, Mathematical models.
Identifiers: Mohole project.

A Vessel Heave Compensator for the logging cable was designed. Subsequent studies revealed that a reduction of the cable tension at the winch is highly desirable in order to reduce the cutting action of the cable as it spools itself on the winch drum. A prototype Logging Cable Head was designed to simplify the interchange of all logging equipment. Recommendations were made for changes to the platform Contract Plans and Specifications. The agenda included 23 items ranging from the major considerations of propulsion units, main power plant, structural design, dry docking, and United States Coast Guard requirements to relatively minor items such as scientific laboratories propane requirements, and interior decoration allowance. An outline of computer runs was received for the positioning control system analysis, together with data concerning a math model of the positioning system. This information presented the mathematical expressions for the control and environmental force functions for the Mohole platform equations of motion. Model testing revealed that anomalous roll response occurred at the natural period of 40 seconds. Maximum roll amplitudes were recorded during these long period excursions which were several times as great as the response at the exciting wave periods. A short baseline sonar transponder with magnetic circuitry was proposed. This transponder should provide a reliable low-power device. Consultants will submit a proposed schedule for procurement, installation, checkout of the communications and navigation equipment.
PB-175 240 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING FEBRUARY 15, 1965, NAVAL ARCHITECTURE, MARINE ENGINEERING AND INSTRUMENTATION SECTION.
Brown and Root, Inc., Houston, Tex.
28 Feb 65, 54p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Specifications, Hydrodynamics, Model tests, Propellers (Marine), Marine propulsion, Power, Communication systems, Floats, Navigation, Marine engineering, Instrumentation.
Identifiers: Mohole project, Drilling vessels.

Contents: Contract plans and specifications; Hydrodynamics and model tests; Vessel positioning; Power generation; Communications and navigation.
PB-175 241 HC$3.00 MF$0.65

MARINE PROPULSION MOTORS - EQUIPMENT SPECIFICATION.
Project MOHOLE scientific and technical progress for the period ending 15 Feb 65.
Brown and Root, Inc., Houston, Tex.
28 Feb 65, 24p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Marine propulsion, Electric motors), Diesel engines, Control systems, Design, Specifications, Propellers (Marine).
Identifiers: Mohole project.

The report consists of excerpts from Subcontract 64-79. It contains the Scope of Work portion of the subcontract, which specifies the items that the subcontractor shall fabricate. These items are: two d-c marine propulsion motors, rated 135 rpm, 7500 hp, 680 volts dc; all necessary main propulsion controls, excitation equipment, a-c and d-c accessories and pneumatic control equipment for these accessories; an engine room control panel for monitoring and control of 13 d-c diesel engine generator units; an underway console for the monitoring of performance and operational control of both main propulsion motors. Detailed descriptions of each of the above items are given in these excerpts from the subcontract. Information is given relating to the character of the d-c generators supplying power for the propulsion motors, along with other operational data necessary to the competent design of the panels. (Author)
PB-175 242 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING FEBRUARY 15, 1965, DRILLING SECTION.
Brown and Root, Inc., Houston, Tex.
28 Feb 67, 76p
Contract NSF-C-260
See also PB-175 256.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Couplings, Positioning devices (Machinery), Pipes, Drilling, Supports, Buoys, Drills.
Identifiers: Mohole project.

Contents: Rotating equipment; Pipe handling; Drill pipe; Riser support system; Down-hole drills.
PB-175 243 HC$3.00 MF$0.65

JANUARY PROGRESS REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 Feb 65.
Battelle Memorial Inst., Columbus, Ohio.
15 Feb 65, 10p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Steel, Crack propagation), Sea water, Fatigue (Mechanics), Stresses, Experimental data, Pipes.
Identifiers: Mohole project, Drill pipes.

The letter report, with tables and figures, presents the experimental results of crack propagation tests conducted in unagitated seawater at 60 cpm. These tests showed a significant decrease in crack initiation time, and a significant increase in crack propagation rate as compared to similar data obtained in air. The tests also indicated that optical means are satisfactory for observation of crack growth in seawater, but that observation of crack growth rates in drilling mud will require an alternate means. (Author)
PB-175 244 HC$3.00 MF$0.65

CUMULATIVE FATIGUE DAMAGE ASSESSMENT.
Project MOHOLE scientific and technical progress for the period ending 15 Feb 65,
Curtiss-Wright Corp., Caldwell, N. J. Curtiss Div.
William C. Schulte. 8 Feb 65, 7p
Contract NSF-C-260
See also PB-175 246.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Stresses, Steel, Bending, Torsion, Tests.
Identifiers: Mohole project, Drill pipes.

This is the tenth monthly progress report on 'Cumulative Fatigue Damage Assessment' with attached performance charts indicating the expenditures to date and estimates of the percentage of completion. Work under way by the subcontractor is aimed at explaining an anomaly in test data generated by fatigue tests on smooth specimens at a mean stress of 75 ksi. The indicated fatigue limit of plus or minus 42 ksi does not compare well with the plus or minus 58 ksi obtained under similar conditions at Battelle. (Author)
PB-175 245 HC$3.00 MF$0.65

FATIGUE ANALYSIS OF MOHOLE DRILL PIPE.
Project MOHOLE scientific and technical progress for the period ending 15 Feb 65,
Curtiss-Wright Corp., Caldwell, N. J. Curtiss Div.
F. B. Stulen and W. C. Schulte. 15 Feb 65, 124p
Rept. no. C-2951
Contract NSF-C-260
Previously announced as PB-167 161. See also PB-175 245.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Steel, Life expectancy, Stresses, Corrosion, Failure (Mechanics), Reliability, Crack propagation, Cracks.
Identifiers: Mohole project, Drill pipes.

Contents: The structural problem of the drill pipe; Method of fatigue analysis; fatigue test data of the 135-type steel and pipe; Analysis of the test data; Typical calculations for fatigue life.
PB-175 246 HC$3.00 MF$0.65

PROJECT MOHOLE PROGRESS REPORT, JANUARY 1, 1965 TO FEBRUARY 15, 1965.
AMF-Tuboscope, Inc., Houston, Tex.
15 Feb 65, 21p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Non-destructive testing, *Pipes), Thickness, Cracks, Mechanical properties, Sensitivity, Machining, Coils, Detection, Electronic equipment, Circuits.
Identifiers: Mohole project, Drill pipes.

The report is of the design and development of equipment and techniques for nondestructive pipe inspection, describes equipment performance tests conducted by the subcontractor (and witnessed by Project Mohole personnel) during the reporting period. The report includes sample logs made during inspection of several joints of pipe and indicates the status of work on other items of equipment which were not included in the demonstration. (Author)
PB-175 247 HC$3.00 MF$0.65

TITANIUM DRILL PIPE EXTRUSION INVESTIGATIONS.
Project MOHOLE scientific and technical progress for the period ending 15 Feb 65,
Harvey Aluminum Co., Torrance, Calif.
G. A. Moudry. 6 Feb 65, 6p Letter rept-1
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, *Titanium alloys), Drilling machines, Extrusion, Mechanical working, Presses (Machinery), Lubrication, Costs, Material forming.
Identifiers: Mohole project.

The report is the initial progress report submitted by the subcontractor in the program of development of manufacturing data on titanium alloy tube suitable for use as Mohole drill pipe. In this program, the titanium alloy tubes required are nominally 5 1/2-in. OD x 0.500-in. wall and 5-in. OD x 0.296-in. wall, both in lengths of 45 ft plus or minus 6 in. Such a tube will of necessity be produced on an 8,000- or 12,000-ton extrusion press. Since several lubrication and extrusion techniques will be examined, the subcontractor has chosen to minimize setup time and material expense by performing preliminary work on a 3,850-ton press.

The data received will be projected to the larger billet required for the ultimate tubes. Work currently in preparation covers the following: piercing, bare extrusion, steel jacketing, and copper jacketing.
PB-175 248 HC$3.00 MF$0.65

DRILL PIPE FATIGUE TEST MACHINE.
Project MOHOLE scientific and technical progress for the period ending 15 Feb 65,
Budd Co., Philadelphia, Pa.
H. M. Russell-French. 8 Feb 65, 10p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), (*Test equipment, *Fatigue (Mechanics)), Design, Drag.
Identifiers: Mohole project, Drill pipes.

The conceptual design of the drill pipe fatigue test machine was studied and reviewed. It was decided to propose several changes to the conceptual design. The proposed changes are listed and explained concisely in the report. Simplification of the drag coefficient was also investigated. It was concluded that the saving in computer time would be so small that, unless there were no reduction in accuracy, the simplification would not be justified.
PB-175 249 HC$3.00 MF$0.65

COMPOSITE STRUCTURE UTILIZING INLYTE BUOYANCY MATERIALS.
Project MOHOLE scientific and technical progress for the period ending 15 Feb 65,
General Motors Corp., Dayton, Ohio. Inland Mfg. Div.
A. J. Bartholomew. 16 Feb 65, 22p
Contract NSF-C-260
See also PB-175 259.

Descriptors: (*Well logging, Feasibility studies), (*Expanded plastics, Hydrostatic tests), (*Composite materials, Hydrostatic tests), Buoyancy, Density, Absorption (Physical), Water, Glass, Spheres, Compressive properties, Volume, Cylindrical bodies, Foams, Coatings, Buoys, Experimental data.
Identifiers: Mohole project.

Progress is reported of an investigation to compare the strength of hollow Inlyte and a composite of Inlyte and large glass spheres with that of solid Inlyte.
PB-175 250 HC$3.00 MF$0.65

UNDERWATER GAS GENERATOR PRELIMINARY DESIGN REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 Feb 67,
Westinghouse Electric Corp., Sunnyvale, Calif.
A. E. Patterson. 25 Feb 65, 137p
Contract NSF-C-260
Previously announced as PB-167 158.

Descriptors: (*Well logging, Feasibility studies), (*Gas generator engines, *Jatos), Underwater, Design, Performance (Engineering), Coolants, Carbon dioxide, Ammonia, Stresses, Buoyancy.
Identifiers: Mohole project.

A system was designed that will meet incremental buoyancy requirements up to 300 feet depth (52,500 pounds net buoyancy in 14 seconds at 290 feet) and total buoyancy requirements down to 400 feet (600,000 pounds net buoyancy from 16 modules.) The system for 600,000 pounds net buoyancy is comprised of 16 modules each containing a 14DS1000 JATO unit, 878 pounds of liquid CO2, and the triggering mechanism transformer. Each module is attached to a common manifold by way of an isolation valve that may be manually closed for underwater replacement of a complete module. The manifold terminates in two additional isolation valves that will be closed during system installation and will be open to piping to the inflatable buoy after installation. All isolation valves are electrically monitored from the surface to ensure that they are full open before firing. The buoyancy generating gas will be delivered to the inflatable buoy at an average temperature of approximately 70F and will contain no corrosive products.
PB-175 251 HC$3.00 MF$0.65

PROTOTYPE RETRACTABLE CORE BIT HEAD BARRELS.
Project MOHOLE scientific and technical progress for the period ending 15 Feb 65,
Christensen Diamond Products Co., Salt Lake City, Utah.
H. C. Bridwell. 3 Feb 65, 20p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Design), Diamonds, Machine tools, Rotation, Drilling machines, Thickness, Mechanical drawing.
Identifiers: Mohole project.

The January 1965 monthly progress report for the Design of a Retractable Diamond Core Bit and Barrel shows the status of work being conducted. At the present time work is mainly centered on the design, manufacture, and study of models of potential retractable bit systems. Preliminary designs on various other new systems are continuing. Pattern shop work has been completed on two models which are now under study and refinement. (Author)
PB-175 252 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING FEBRUARY 15, 1965, SCHEDULING SECTION AND SUBCONTRACT SECTION.
Brown and Root, Inc., Houston, Tex.
28 Feb 67, 11p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Contracts, Scheduling, Research program administration, Costs, Design, Procurement.
Identifiers: Mohole project.

Summary reports of subcontracts dated 31 January 1965 are listed.
PB-175 253 HC$3.00 MF$0.65

SCIENCE SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Mar 65.
Brown and Root, Inc., Houston, Tex.
31 Mar 65, 19p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Test equipment, Performance (Engineering)), Malfunctions, Power supplies, Electric cables, Diodes, Circuits, Marine engineering, Instrumentation, Hydrophones, Transponders, Communication equipment, Interference, Position finding, Tensiometers.
Identifiers: Mohole project.

A breadboard model of the preliminary circuit of the Down-Hole Logging Cable Tension Device was completed and heat-tested. The device provides information about the behavior and condition of tools used on the end of the logging cable. The prototype phase comparison sonar hydrophone, long baseline overside transducer, and phase comparison sonar beacon for the Vessel Positioning system were completed. Tests of this equipment are included. Breadboard equipment of the integrator offset controls for the positioning control computer was also completed. In the field of power generation the successful bidder will design, fabricate, test, and furnish a complete main marine propulsion system to conform to specifications. The subcontractor will furnish the engineering, technical, and supervisory personnel, labor, materials, tools, and equipment, as required for the tasks. The drilling platform antenna design proposals were scheduled for return submittal to Project Mohole offices by March 29, 1965.
PB-175 254 HC$3.00 MF$0.65

NAVAL ARCHITECTURE, MARINE ENGINEERING, AND INSTRUMENTATION.
Project MOHOLE scientific and technical progress rept. for 15 Mar 65.
Brown and Root, Inc., Houston, Tex.
1965, 57p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Propellers (Marine), Marine propulsion, Power, Communication systems, Navigation, Ship hulls, Floats, Structures, Marine engineering, Instrumentation.
Identifiers: Mohole project, Drilling vessels.

Contents: Vessel positioning; Power generation; Communications and navigation; Platform structure and hull.
PB-175 255 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Mar 65.
Brown and Root, Inc., Houston, Tex.
1965, 46p
Contract NSF-C-260
See also PB-175 277.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Hoists, Couplings, Positioning devices (Machinery), Pipes, Drilling, Stresses, Supports, Buoys, Cutting fluids, Drills, Additives.
Identifiers: Mohole project.

Contents: Hoisting equipment; Rotating equipment; Pipe handling equipment; Drill pipe; Riser system; Riser support system; Mud system; Down-hole drills.
PB-175 256 HC$3.00 MF$0.65

TECHNICAL WORK STATUS REPORT AND DRILL PIPE FATIGUE TEST MACHINE MONTHLY PROGRESS REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 Mar 65.
Bowen Tools, Inc., Houston, Tex.
15 Mar 65, 14p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), (*Test equipment, *Fatigue (Mechanics)), Design, Power supplies, Electrical equipment, Specifications, Performance (Engineering), Stresses, Axle shafts, Extrusion, Grain structures (Metallurgy), Press forging, Titanium alloys.
Identifiers: Mohole project, Drill pipes.

Minor modifications were made of the subcontract to design and procure an electric power sub. Finer detail was established for the specifications of the electrical equipment. Major effort in the design and construction of a full-scale drill pipe fatigue test machine was directed towards detail design of the rocker arm, the load link, and the installation of the roller bearings associated with these elements and those for the rocker arm supports and the pitman connection. Titanium drill pipe extrusion investigations consisted of preliminary experimental piercing, bare extrusion, steel jacketed extrusion, and copper jacketed extrusion on a 3,850-ton press in preparation for full-scale extrusion on an 8,000-ton press.
PB-175 257 HC$3.00 MF$0.65

DYNAMIC STRESS ANALYSIS OF THE MOHOLE RISER SYSTEM. PART I.

Project MOHOLE final rept. Apr-Dec 64.
National Engineering Science Co., Houston, Tex.
1964, 101p
Contract NSF-C-260
See PB-175 294.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Motion, Damping, Drag, Reynolds number, Drilling, Mathematical analysis, Loading (Mechanics).
Identifiers: Mohole project, Casing.

Methods for analyzing the motions and stresses in a very long beam under tension, with varying properties and loading along the length and with time variable boundary conditions, were developed and were applied to the feasibility investigation of a marine conductor for the Mohole. The analysis included several factors that have been omitted for simplicity in studies of similar structures made by previous investigators. In particular, the following were included: (a) Flexural rigidity along the entire length of the beam; (b) square-law damping, with drag coefficients functions of local Reynolds number; (c) wave excitations; (d) three-dimensional excitations and motions. The principal result of the analysis was a riser design capable of withstanding the anticipated environment during the extended period of time that the Mohole drilling may require. Recommendations for studies to refine and optimize the design are included. (Author)
PB-175 258 HC$3.00 MF$0.65

REPORT ON COMPOSITE STRUCTURES UTILIZING INLYTE BUOYANCY MATERIALS.
Project MOHOLE final rept.
General Motors Corp., Dayton, Ohio. Inland Manufacturing Div.
10 Mar 65, 27p
Contract NSF-C-260
See also PB-175 250.

Descriptors: (*Well logging, Feasibility studies), (*Expanded plastics, Hydrostatic tests), (*Composite materials, Hydrostatic tests), Buoyancy, Density, Absorption (Physical), Water, Glass, Spheres, Compressive properties, Volume, Cylindrical bodies, Foams, Coatings, Buoys, Experimental data.
Identifiers: Mohole project.

Hydrostatic pressures resulting in structural failure of solid cylinders of Inlyte and of cylinders of Inlyte with large, machined, spherical inclusions are more consistent and more predictable than those resulting in failure of composites of Inlyte and large glass spheres. Whereas the solid cylinders of Inlyte fail by slow compressive yielding at predictable pressures, both the hollow Inlyte and the Inlyte glass-sphere composite test specimens collapse at unpredictable pressures. The tests performed under this subcontract indicate that reasonable predictability of strength characteristics of large glass-sphere and syntactic foam structures will be very difficult to obtain. Also, the tests show that this type fails with a violent implosion. Tables and figures, illustrating in detail the test results, are included. (Author)
PB-175 259 HC$3.00 MF$0.65

EFFECT OF CORROSION INHIBITOR WP 1210 ON DRILLING FLUID FRICTION IN REDUCING AGENTS.
Project MOHOLE final rept.,
Pan American Petroleum Corp., Tulsa, Okla.
B. V. Randall. 1965, 8p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Corrosion inhibition), (*Corrosion inhibition, Materials), Sea Water, Corrosion, Fatigue (Mechanics), Drilling machines, Floating bodies, Marine geology, Friction.
Identifiers: Mohole project.

The final report from Pan American Petroleum Corporation recommended the use of flax meal where high temperatures are not expected and Nalco RV-13 where high temperatures may be encountered (in either fresh water or seawater as drilling fluids) to reduce fluid friction in the drilling of the Mohole. Supplement 6, an extension of this subcontract, had as its objective the determination of what effect, if any, the use of corrosion inhibitors would have on the recommended fluid friction additives in either fresh water or seawater. The corrosion inhibitor selected for testing was Weilmuenster's Inc., WP 1210. The report presented here records the results of this study. The effects of the Weilmuenster corrosion inhibitor were evaluated by pumping tap water, synthetic seawater, and waters containing flax gum, RV-13, and corrosion inhibitor in both the small-scale and large-scale test apparatuses described in the final report.
PB-175 260 HC$3.00 MF$0.65

PROTOTYPE RETRACTABLE CORE BIT HEAT BARRELS.
Project MOHOLE monthly progress rept.,
Christensen Diamond Products Co., Salt Lake City, Utah.
H. C. Bridwell. 1965, 21p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Design), Diamonds, Pipes, Drills, Mechanical drawings, Rods, Tables, Diagrams.
Identifiers: Mohole project.

For each of the four models, the report presents a description, an analysis of the design's advantages and disadvantages, and an evaluation of practical possibilities. No. 1 is a staggered expansion retractable bit. This design will be included in the final analysis for selection of a system for prototype fabrication. No. 2, an expandable nonstaggered retractable bit, has a major improvement made in the pad structure since Christensen's last reporting period and is now considered to have the greatest apparent potential of the systems studied to date. This system will be considered in the final analysis. No. 3, a staggered pad-latched retractable bit, has provided some good design features which will be of value in pursuit of other concepts but, because of the disadvantages of this system, work on it has been discontinued. No. 4, a staggered rod-set retractable bit, appears to have high potential. (Author)
PB-175 261 HC$3.00 MF$0.65

SUMMARY AND SCIENCE SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 65.
Brown and Root, Inc., Houston, Tex.
31 Apr 65, 13p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Fatigue (Mechanics), Design, Effectiveness, Sea water, Oxygen, Zinc, Stresses, Electroplating, Steel, Drilling machines, Joints, Plastics, Extrusion, Thickness, Coatings, Instrumentation.
Identifiers: Mohole project.

Battelle Memorial Institute, Subcontract 64-75, has continued corrosion fatigue tests on drill pipe in evaluating the effectiveness of corrosion control methods. Data from fatigue tests in chemically deaerated seawater fell on essentially the same S-N curve as those in aerated seawater. Analysis of the oxygen content in the system indicated only partial removal of oxygen, whereby fatigue test results may not represent the benefit possible from complete oxygen removal. Corrosion fatigue tests on specimens coated with 4 mils of electroplated zinc are complete. A comprehensive report, 'The Effect of High Pressure on Electrolysis and the Absorption of Hydrogen by Steel at Ambient and Elevated Temperatures', was submitted by Battelle, and it concludes that hydrogen embrittlement is a potential problem at the temperatures and pressures anticipated in the deep drilling stages. Harvey Aluminum has completed the initial Titanium Extrusion Tests scheduled for the 3,850-ton press. Two tubes were successfully extruded in the bare condition (chemical coating only) from previously pierced billets, and surface condition was significantly improved. (Author)
PB-175 262 HC$3.00 MF$0.65

NAVAL ARCHITECTURE, MARINE ENGINEERING, AND INSTRUMENTATION SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 65.
Brown and Root, Inc., Houston, Tex.
1965, 8p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Propellers (Marine), Ships, Floats, Marine propulsion, Steering, Power equipment, Generators, Communication systems, Navigation, Marine engineering.
Identifiers: Mohole project, Drilling vessels.

Contents: Vessel positioning system; Positioning units; Power generation; Communications and navigation.
PB-175 263 HC$3.00 MF$0.65

SHIPBOARD GYROCOMPASS SYSTEM.
Project MOHOLE scientific and technical progress rept. for 15 Apr 65.
Honeywell, Inc., Durate, Calif.
15 Apr 65, 13p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Gyro compasses, Shipborne), Specifications, Performance (Engineering), Configuration, Electrical engineering, Installation, Military requirements, Temperature, Humidity, Vibration, Moisture, Fungusproofing, Maintenance, Operation.
Identifiers: Mohole project.

The specification covers the requirements for the shipboard gyrocompass and associated auxiliary apparatus hereinafter referred to as the gyrocompass system. The intent of this specification is to define the gyrocompass system equipment physical configuration and performance characteristics.
PB-175 264 HC$3.00 MF$0.65

ENGINEERING DEVICE SPECIFICATION FOR PHASE COMPUTER MODULE FOR USE IN PROJECT MOHOLE SHIP POSITIONING SYSTEM.
Project MOHOLE scientific and technical progress rept. for 15 Apr 65,
Honeywell, Inc., Durate, Calif.
J. L. Hinshaw. 15 Apr 65, 18p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Modules (Electronics), Positioning devices (Machinery)), Phase shifters, Computers, Specifications, Shipborne, Ships, Environmental tests.
Identifiers: Mohole project.

This specification covers the detail design, documentation, and fabrication of a phase computing module for use in the Project MOHOLE Phase Comparison System. A module is defined as a self-contained package containing all electronic and electromechanical components necessary to perform the functions described in this specification. The Phase Computing Module will be used to determine the phase difference between two input signals of like frequency and also to perform a system compensating function by addition of a positive or negative quantity to the phase difference measured above.
PB-175 265 HC$3.00 MF$0.65

FREQUENCY CONVERTER, 60 cps TO 400 cps.
Project MOHOLE scientific and technical progress rept. for 15 Apr 65,
Honeywell, Inc., Durate, Calif.
H. Clark. 15 Apr 65, 10p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Frequency converters, Specifications), Design, Reliability, Voltage, Transients, Electrical properties, Circuits, Weight, Cooling, Electric motors.
Identifiers: Mohole project.

The specification covers the requirements for a shipboard motor alternator, 60 cps to 400 cps frequency converter. The specifications define the frequency converter physical configuration and performance characteristics. (Author)
PB-175 266 HC$3.00 MF$0.65

SERVO AMPLIFIER, 400 cps, 6.5 WATT.
Project MOHOLE scientific and technical progress rept. for 15 Apr 65.
Honeywell, Inc., Durate, Calif.
15 Apr 65, 8p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Servo amplifiers, Specifications), Protective treatments, Coatings, Corrosion inhibition, Epoxy plastics, Mechanical drawings, Electronic equipment, Voltage, Design, Vibration, Humidity, Frequency, Capacitors.
Identifiers: Mohole project.

The specification covers the requirements and characteristics for Servo-Amplifier, 400 cps, 6.5 watt. (Author)
PB-175 267 HC$3.00 MF$0.65

PREAMPLIFIER-MODULATOR.
Project MOHOLE scientific and technical progress rept. for 15 Apr 65.
Honeywell, Inc., Durate, Calif.
15 Apr 65, 8p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Preamplifiers, *Modulators), Protective treatments, Coatings, Corrosion inhibition, Epoxy plastics, Mechanical fasteners, Electronic equipment, Mechanical drawings, Gain, Voltage, Design, Vibration, Humidity, Frequency, Specifications.
Identifiers: Mohole project.

The specification covers the requirements and characteristics for a preamplifier-modulator to be used as a companion to a servo amplifier. (Author)
PB-175 268 HC$3.00 MF$0.65

INSTRUMENTATION RECORDER SYSTEM.
Project MOHOLE scientific and technical progress rept. for 15 Apr 65.
Honeywell, Inc., Durate, Calif.
15 Apr 65, 11p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Instrumentation, Recording systems), Specifications, Design, Electronic equipment, Vibration, Humidity, Moisture, Weight, Protective treatments, Wire, Calibration.
Identifiers: Mohole project.

The specification covers the requirements for an instrumentation recorder assembly and associated auxiliary apparatus. The intent of this specification is to establish the recorder equipment physical configuration and performance characteristics. (Author)
PB-175 269 HC$3.00 MF$0.65

POWER SUPPLY, GENERAL PURPOSE, 28 VDC.
Project MOHOLE scientific and technical progress rept. for 15 Apr 65,
Honeywell, Inc., Durate, Calif.
H. Clark. 15 Apr 65, 9p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Power supplies, Specifications), Performance (Engineering), Design, Maintenance, Reliability, Electrical equipment, Voltage, Frequency, Meters.
Identifiers: Mohole project.

The specification covers the requirements for a shipboard general purpose 28 V DC power supply. The intent of this specification is to define the power supply physical configuration and performance characteristics. (Author)
PB-175 270 HC$3.00 MF$0.65

SOLID STATE OPERATIONAL AMPLIFIER.
Project MOHOLE scientific and technical progress rept. for 15 Apr 65.
Honeywell, Inc., Durate, Calif.
15 Apr 65, 8p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Amplifiers, Specifications), Protective treatments, Coatings, Corrosion inhibition, Mechanical drawings, Semiconductors, Circuits, Electric currents, Gain, Voltage, Environmental tests, Humidity, Vibration.
Identifiers: Mohole project.

The specifications cover the requirements and characteristics for Operational Amplifier, Solid State. (Author)
PB-175 271 HC$3.00 MF$0.65

MOHOLE PROTOTYPE SEA TESTS.
Project MOHOLE scientific and technical progress rept. for 15 Apr 65.
GM Defense Research Labs., Santa Barbara, Calif.
13 Apr 65, 6p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Sonar signals, Processing), Sonar equipment, Tests, Shipborne, Ocean waves, Interference, Performance (Engineering), Statistical data.
Identifiers: Mohole project.

The report presents a program for a series of sea tests to be conducted to satisfy the following objectives: to determine the operation of sonar components in a shipboard environment, to observe the processing of signals perturbed by the ocean, and lastly to collect statistical data on signal processor and to verify performance under actual conditions at sea. These sea tests are planned to be conducted on a daytime basis at a location in the Santa Barbara Basin of the Pacific Ocean. The test configuration will use a bottom mounted projector with a direct cable connection to the experimental ship. This projector will replace the transponder which would normally be used with the system. The equipment will be evaluated for a variety of performance parameters such as: general operating characteristics, dynamic range performance, signal verifier performance, missed signal/included signal statistics, and coordinate jitter statistics. (Author)
PB-175 272 HC$3.00 MF$0.65

SPECIFICATION FOR CONSTRUCTION OF THE POSITIONING UNITS FOR THE FLOATING DRILLING PLATFORM.
Project MOHOLE scientific and technical progress rept. for 15 Apr 65.
Gibbs and Cox, Inc., New York.
19 Feb 65, 90p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Positioning devices (Machinery), *Floating docks), (*Floats, *Specifications), Drilling machines, Machine tools, Construction, Control systems, Spare parts, Logistics.
Identifiers: Mohole project.

The specification contains technical requirements and information relating to the construction (including equipment, appurtenances, and installation) of electrically powered, propeller driven positioning units for use with the Mohole drilling platform. It is the intent of this specification to obtain propeller driven positioning units with machinery and equipment complete, and in every way ready for operation and service (unless specific exception is made herein).
PB-175 273 HC$3.00 MF$0.65

REQUEST FOR PROPOSAL NO. 86. POSITIONING UNITS AND ACCESSORIES.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 65.
Brown and Root, Inc., Houston, Tex.
1965, 11p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Positioning devices (Machinery), *Floating docks), (*Floats, Environmental tests), Costs, Procurement, Drilling machines, Specifications, Machine tools.
Identifiers: Mohole project.

Request for proposals for the design, manufacture, testing and delivery of positioning units and accessories for a self-propelled propeller floating drilling platform.
PB-175 274 HC$3.00 MF$0.65

REQUEST FOR PROPOSAL 80. DRILLING AND POSITIONING ELECTRICAL EQUIPMENT.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 65.
Brown and Root, Inc., Houston, Tex.
1965, 37p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Positioning devices (Machinery), *Electrical equipment), Drilling machines, Engines + motors, Generators, Relays, Drills, Pumps, Circuits, Sonar equipment, Gyro compasses, Radar, Computers, Remote control systems, Calibration, Specifications.
Identifiers: Mohole project.

Describes the specifications as to how drilling equipment and controls, and positioning system equipment supplied by contractor or seller should operate and function.
PB-175 275 HC$3.00 MF$0.65

RESISTANCE AND YAW MOMENTS OF THE UNDERWATER PORTION OF THE MOHOLE DRILLING PLATFORM AS PREDICTED FROM MODEL TESTS.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 65,
David Taylor Model Basin, Washington, D. C.
William Kopko. Aug 64, 19p DTMB-1890
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship models, Model tests), Drag, Yaw, Moments, Floats, Drilling machines, Performance (Engineering), Cylindrical bodies.
Identifiers: Mohole project, Drilling vessels.

The report discusses the predictions of the resistance and yaw moments of the underwater portion of the MOHOLE Drilling Platform at a 70 foot draft and for various angles of yaw. Special emphasis is given to the discussion of the determination of wave-making resistance of the surface piercing cylinders and struts of the MOHOLE since very little published data at low Froude numbers are available. The wave-making resistance predictions, based on tests of a 27-inch diameter circular

cylinder, are combined with the wind tunnel test results of the MOHOLE model to obtain the total underwater resistance. All the predictions made in the report are for calm water conditions only. (Author)
PB-175 276 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 65.
Brown and Root, Inc., Houston, Tex.
1965, 18p
Contract NSF-C-260
See also PB-175 289.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Hoists, Couplings, Pipes, Drilling, Supports, Cutting fluids, Drills, Gas generating systems, Underwater equipment.
Identifiers: Mohole project.

Contents: Hoisting equipment; Rotating equipment; Pipe handling equipment; Drill pipe; Riser system; Riser support system; Mud system; Downhole drills.
PB-175 277 HC$3.00 MF$0.65

DESIGN AND PROCUREMENT OF CONVENTIONAL TYPE DRAWWORKS.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 65.
National Supply Div., Torrance, Calif.
31 Mar 65, 8p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Hoists, Drilling machines), Design, Drilling.
Identifiers: Mohole project.

Detailed manufacturing drawings on long lead time components for the drawworks were completed and certain patterns were ordered for some items to be made from castings. Parts of the drum shaft assembly have been scheduled for manufacture. Design studies to reduce the width of the traveling block have been made; this rearrangement tends to stabilize the block when raised or lowered with light loads. Weight of the elevators and links has been calculated to determine the connector spring requirements.
PB-175 278 HC$3.00 MF$0.65

REQUEST FOR PROPOSAL 77. HORIZONTAL PIPE RACKER.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 65.
Brown and Root, Inc., Houston, Tex.
19 Mar 65, 126p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Positioning devices (Machinery), Pipes), Drilling, Mechanical drawings, Automation, Conveyors, Design, Hoists.
Identifiers: Mohole project.

A pipe handling system will be required on the Mohole drilling platform for storing and handling a maximum quantity of 39,000 feet of drill pipe and 19,000 feet of riser pipe. An automated pipe racking system was required as an integral part of the pipe handling system. The system consists of the following major components: Two sets of drill pipe storage racks, four sets of riser pipe storage racks, four pipe hoist and trolley assemblies, four pipe hoist booms, a center track conveyor, a control system, a set of spare parts.
PB-175 279 HC$3.00 MF$0.65

CORROSION FATIGUE.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 65.
Battelle Memorial Inst., Columbus, Ohio.
15 Apr 65, 9p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Corrosion inhibition, *Pipes), Steel, Zinc coatings, Fatigue (Mechanics), Sea water, Cutting fluids, Corrosion, Additives, Heat treatment, Stresses.
Identifiers: Mohole project, Drill pipes.

Two areas were investigated for alleviation of the corrosion fatigue problem for the 135 type steels. These areas are in the treatment of the drilling fluid and in the coating of the drill pipe material. In an evaluation of the former, an attempt was made to deaerate the seawater and observe the effect of the lower oxygen content. The results of this are inconclusive. In carrying out the latter investigation, the report presents the effects of zinc electroplating on the fatigue behavior of 135 type steel in seawater. The results presented in this report indicate that substantial improvement in fatigue behavior of this steel can be attained by the zinc electroplate process. (Author)
PB-175 280 HC$3.00 MF$0.65

THE EFFECTS OF HIGH PRESSURE ON ELECTROLYSIS AND THE ABSORPTION OF HYDROGEN BY STEEL AT AMBIENT AND ELEVATED TEMPERATURES.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 65,
Battelle Memorial Inst., Columbus, Ohio.
T. P. Groeneveld, E. L. White, A. R. Elsea, W. K. Boyd, and D. W. Hoeppner. 12 Apr 65, 35p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Steel, Hydrogen embrittlement), (*Corrosion inhibition, *Pipes), High-pressure research, Cathodic protection, Electrolysis, Fatigue (Mechanics), Absorption (Physical), Stress corrosion, Cracks, Test equipment.
Identifiers: Mohole project, Drill pipes.

In a study of the effect of pressure on the performance of a zinc-steel couple, it was shown that in the pressure range from 1 to 270 atmospheres, at room temperature, there was no significant change in the potential difference or in the current flowing between the two metals with increasing pressure in a solution of 3-1/2 percent NaCl. Also, it has been reported that the hydrogen over-voltage is reduced at higher pressures. (Author)
PB-175 281 HC$3.00 MF$0.65

TITANIUM DRILL PIPE EXTRUSION INVESTIGATION.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 65.
Harvey Aluminum, Inc., Torrance, Calif.
14 Apr 65, 6p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Mechanical working), Drilling machines, Titanium, Metallurgy, Extrusion, Presses (Machinery), Copper, Material forming.
Identifiers: Mohole project.

The report presents the results of titanium extrusion tests conducted on a 3,850-ton press. Two tubes were successfully extruded in the bare condition from previously pierced billets. Successful extrusion of two copper-jacketed billets also was accomplished. Previous attempts at extrusion using this method had failed because of a high ratio of the cross-sectional area before and after extrusion.
PB-175 282 HC$3.00 MF$0.65

NESCO PROGRESS REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 65.
National Engineering Science Co., Pasadena, Calif.
15 Mar 65, 31p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Bending, Drilling, Computer programs, Mathematical analysis, Loading (Mechanics).
Identifiers: Mohole project, Casing.

The general nature and extent of the work to be carried out under this new subcontract has proceeded on a limited basis and, as a first step, the original assumptions are being rigorously reexamined in an attempt to improve existing computing techniques and to investigate certain aspects of riser and drill pipe stresses previously ignored. The details of these examinations are presented. (Author)
PB-175 283 HC$3.00 MF$0.65

UNDERWATER GAS GENERATOR.
Project MOHOLE progress rept. no. 3, 1 Mar-31 Mar 65,
Westinghouse Electric Corp., Sunnyvale, Calif.
A. E. Patterson. 7 Apr 65, 18p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Gas generating systems, Underwater), (*Floats, Buoyancy), Buoys, Jatos, Coolants, Valves, Firing circuits, Propellants, Pipes, Exhaust gases.
Identifiers: Mohole project.

The subcontractor has been authorized to proceed with the design of a multiple unit, small-scale prototype gas generator and with the design of a single unit, full-scale prototype gas generator. The progress report indicates that long lead time material has been ordered and that laboratory tests have been completed to verify the reliability of the proposed firing circuits. Drawings of these systems also have been submitted with the progress report.
PB-175 284 HC$3.00 MF$0.65

REPORT OF TRIP TO COULTER ELECTRONICS.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 65.
Brown and Root, Inc., Houston, Tex.
1965, 4p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Electronic equipment, Instrumentation), Conductivity, Liquids, Electrodes, Particle size, Cutting fluids, Accuracy, Viscosity, Sampling, Density, Particles, Design, Analysis.
Identifiers: Mohole project.

The report is of a trip to review the Model B Coulter Electronic Particle Size Analyzer. This instrument determines the number and size of particles suspended in an electrically conductive liquid. This is done by forcing the suspension to flow through a small aperture having an immersed electrode on either side. As a particle passes through the aperture, it changes the resistance between the electrodes. This produces a voltage pulse of short duration having a magnitude proportional to the particle volume. The series of pulses is then electronically scanned and counted. A knowledge of the particle size distribution of the Mohole drilling fluid will enable the drilling fluids engineer to determine the effect this distribution has on various properties such as viscosity, gel strength, and fluid loss. It is known that particle size distribution influences drilling fluid properties, but the extent of this influence is not completely understood. It is reasonable to assume that the knowledge of particle size distribution produced in the mud by various diamond bits, when tied into other variables, will lead to improved bit design. As with any instrument there are advantages and limitations. Presented is a brief outline of these in relation to the Coulter Counter and other methods of particle analysis, such as sedimentation, microscopic and air classifications. (Author)
PB-175 285 HC$3.00 MF$0.65

PROTOTYPE RETRACTABLE CORE BIT HEAD AND BARRELS.
Project MOHOLE scientific and technical progress for the period ending 15 Apr 65,

Christensen Diamond Products Co., Salt Lake City, Utah.
H. C. Bridwell. 1965, 16p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Design), Rods, Diamonds, Rotation, Drilling machines, Springs, Photographs.
Identifiers: Mohole project.

The project work has centered on retractable systems utilizing bit pads suspended on rods below the carrier mandrel. Both three and five pad staggered-rod set systems have been under study. The principle advantage with this type is the ability to obtain ample gage diamond coverage along with overall area of diamond coverage while retaining pad strength. The model of the five pad system has been completed and the three pad model is being fabricated. Creative design approaches, preliminary sketching, and layout drafting on step-out designs of existing systems and various other new systems are continuing. The principle project progress continues to be centered on the study of models of the more promising retractable bit designs. (Author)
PB-175 286 HC$3.00 MF$0.65

SCIENCE SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 May 65.
Brown and Root, Inc., Houston, Tex.
31 May 65, 21p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Specifications), Pipes, Fatigue (Mechanics), Instrumentation, Sea water, Temperature, Electric motors, Calibration, Generators, Torque, Oxygen, Design, Stresses, Machine tools.
Identifiers: Mohole project.

A need exists for a rugged, accurate borehole temperature measuring instrument to provide information for use in protecting drilling and logging equipment, for geophysical log interpretation, and for general scientific data. Power sub design has continued under Subcontract 64-71. In-house changes in motor requirements prompted discussions with Bowen Tools, Inc., on motor capability and design. The drill pipe makeup will employ substantial torque force at tool joints and additional torque will be gained against tool joints during drilling operations. Investigation of oxygen levels in seawater used in fatigue testing indicated the oxygen level could be reduced to less than 0.1 ppm, but the flow equipment could not maintain that level. Flow equipment was modified and two tests begun with bare specimens. Westinghouse Corporation has completed the majority of preliminary design work on the underwater gas generator. (Author)
PB-175 287 HC$3.00 MF$0.65

NAVAL ARCHITECTURE, MARINE ENGINEERING, AND INSTRUMENTATION SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 May 65.
Brown and Root, Inc., Houston, Tex.
1965, 33p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Hydrodynamics, Model tests, Propellers (Marine), Marine propulsion, Power, Communication systems, Navigation, Marine engineering, Floats, Instrumentation.
Identifiers: Mohole project, Drilling vessels.

Contents: Hydrodynamics and model tests; Vessel positioning system; Power generation; Communications and navigation.
PB-175 288 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 May 65.
Brown and Root, Inc., Houston, Tex.
1965, 17p
Contract NSF-C-260
See also PB-175 298.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Couplings, Pipes, Drilling, Stresses, Supports, Drills, Gas generating systems, Underwater equipment.
Identifiers: Mohole project.

Contents: Rotating equipment; Drill pipe; Riser system; Riser support system; Downhole drills.
PB-175 289 HC$3.00 MF$0.65

SUMMARY OF MARCH PROGRESS.
Project MOHOLE scientific and technical progress for the period ending 15 May 65.
AMF-Tuboscope, Inc., Houston, Tex.
1965, 12p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Drilling), (*Cracks, Sensitivity), Defects (Materials), Magnetic fields, Walls, Drilling machines, Detectors, Mathematical prediction, Ultrasonic radiation, Small tools.
Identifiers: Mohole project.

Discusses efforts made to improve the sensitivity of the drill pipe Sonde to both ID and OD cracks.
PB-175 290 HC$3.00 MF$0.65

FATIGUE BEHAVIOR OF UNNOTCHED SPECIMENS.
Project MOHOLE scientific and technical progress for the period ending 15 May 65.
Battelle Memorial Inst., Columbus, Ohio.
1965, 11p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Steel, Fatigue (Mechanics)), (*Pipes, Fatigue (Mechanics)), Corrosion, Corrosion inhibition, Zinc coatings, Stresses.
Identifiers: Mohole project, Drill pipes.

In attempts to alleviate the corrosion fatigue problem, treatment of the drilling fluid and coating of the drill pipe were studied. The results of the unplated specimens tested in deaerated seawater indicated that either the deaeration was ineffective or oxygen was being picked up during the course of the fatigue test. Consequently, the oxygen level was checked on several samples of deaerated seawater and, as a result of these tests, it was concluded that the method of circulation of the seawater is unsatisfactory. After equipment modifications are made, further tests will be conducted. The study on the effect of zinc electroplating has progressed, and results of the tests to date are tabulated and plotted in this progress report. These results indicate that substantial improvement of the fatigue behavior of 135-type drill pipe steel is achieved by electroplating with zinc. Tables and plots showing results of the tests on specimens containing holidays (with holiday sizes and locations indicated) are also included. All tests were conducted at 115-ksi maximum stress, 75-ksi mean stress, and 60 cpm. Failure of the specimen with the 1/2-in. holiday occurred in the center of the unplated portion after 428,000 cycles. This result would tend to indicate that protection is partly lost at this size holiday. Additional tests are planned.
PB-175 291 HC$3.00 MF$0.65

DRILL PIPE FATIGUE TEST MACHINE MONTHLY PROGRESS REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 May 65.
Budd Co., Philadelphia, Pa.
10 May 65, 33p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Design, (*Test equipment, *Fatigue (Mechanics)), Stresses, Brakes, Corrosion, Lubricants.
Identifiers: Mohole project, Drill pipes.

It was recommended that a brake to stop the machine (in emergency and when the specimen breaks) be incorporated in the design. The selection of the materials specifications for various elements of the design, based on the stresses shown in the stress analyses, was also discussed. Corrosion tests were conducted for the purpose of evaluating the effectiveness of a cationic inhibitor and nonionic inhibitor when added to six different thread lubricants. Test results indicated that the corrosion rate with commercial thread lubricants is at a relatively low level even under the stringent test conditions.
PB-175 292 HC$3.00 MF$0.65

RISER SYSTEM STRESS ANALYSIS.
Project MOHOLE scientific and technical progress for the period ending 15 May 65.
National Engineering Science Co., Pasadena, Calif.
1965, 52p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Computer programs, Deflection, Drilling, Mathematical analysis, Interactions.
Identifiers: Mohole project, Casing.

Studies during the reporting period concerned drill pipe-riser interaction, computer program improvements, equivalence of individual rings and a continuous guide shoe, and a review of General Motors' analysis of riser deflections. (Author)
PB-175 293 HC$3.00 MF$0.65

DYNAMIC STRESS ANALYSIS OF THE MOHOLE RISER SYSTEM. PART II.
Project MOHOLE final rept.
National Engineering Science Co., Pasadena, Calif.
1965, 346p
Contract NSF-C-260
See also PB-175 258.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Configuration, Hydrodynamics, Buoys, Drag, Oceanology, Ocean currents, Mathematical analysis, Drilling, Design.
Identifiers: Mohole project, Casing.

The report pertains to configurations, dynamics, method of characteristics, buoy configurations and drag, oceanography, and detailed results.
PB-175 294 HC$3.00 MF$0.65

PROTOTYPE RETRACTABLE CORE BIT HEAD AND BARRELS.
Project MOHOLE scientific and technical progress rept. for 15 May 65,
Christensen Diamond Products Co., Salt Lake City, Utaha
H. C. Bridwell. 15 May 65, 25p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Design), Specifications, Drilling machines, Scale, Diagrams.
Identifiers: Mohole project.

The research contains the final layout and design work on the three most promising retractable systems. These systems are : three-pad staggered floating pad retractable bit - 3 PS (FP); three-pad staggered carrier mounted pad retractable bit - 3 PS (CM); and three-pad nonstaggered carrier mounted pad retractable bit - 3 PNS (CM). Operable working models of these systems have been fabricated and full-scale working layouts are being drawn. (Author)
PB-175 295 HC$3.00 MF$0.65

SUMMARY AND SCIENCE SECTION.
Project MOHOLE scientific and technical progress rept. for 15 Jun 65.
Brown and Root, Inc., Houston, Tex.
30 Jun 65, 25p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Geophysical prospecting, *Site selection), Tensiometers, Oceanology, Atlantic Ocean, Mexico Gulf, Pacific Ocean, Instrumentation, Design, Performance (Engineering), Electric cables, Marine engineering, Marine geology, Drilling, Position finding, Pipes, Stresses.
Identifiers: Mohole project.

Progress in the Logging and Measurement program continued with completion and testing of the first prototype logging cable head. There were some minor design changes, giving increased flexibility to the unit. The partial testing already performed indicated that the basic head design was good and would perform satisfactorily within design specifications. Development of the downhole logging cable tension device, for use in the cable head on all wireline operations, is discussed. Studies were initiated to establish the feasibility of making such a strain gauge instrument which would also be compatible with other downhole instrumentation. A preliminary investigation was made to determine suitable Initial Positioning System Test Sites consistent with these criteria: distance from shore - 100 nautical miles; depth - 1200 fathoms; location - as close as possible to various bidding shipbuilders; surface current - less than 1 knot; weather conditions - moderate; wave conditions - various; bottom conditions - relatively flat. Sites off each coast were selected as follows: Atlantic Ocean, two sites - north of Bermuda and west of Abaco Island; Gulf of Mexico, three sites - south of Biloxi, Miss., east of Pta. Jerez, Mexico, and east of Pta. Delgada, Mexico; Pacific Coast, two sites - west-southwest of San Miguel Island and southwest of Monterey, California.
PB-175 296 HC$3.00 MF$0.65

DOWNHOLE LOGGING CABLE TENSION DEVICE.
Project MOHOLE final scientific and technical progress rept. for 15 Jun 65.
Texaco Experiment, Inc., Richmond, Va.
22 Mar 65, 25p TP-245
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Tensiometers, Electric cables), Design, Test methods, Strain gages, Circuits, Equations, Performance (Engineering).
Identifiers: Mohole project.

Preprototype design of the downhole logging cable tension device was completed. The system description, the description of each of the subsystems black boxes, component selection, and testing program, are presented.
PB-175 297 HC$3.00 MF$0.65

NAVAL ARCHITECTURE, MARINE ENGINEERING, AND INSTRUMENTATION SECTION. DRILLING SECTION.
Project MOHOLE scientific and technical progress rept. for 15 Jun 65.
Brown and Root, Inc., Houston, Tex.
15 Jun 65, 38p
Contract NSF-C-260
See also PB-175 303.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Position finding, Sonar, Transponders, Antennas, Interference, Pipes, Drilling, Corrosion, Stresses, Supports, Gas generating systems, Drills, Underwater equipment.
Identifiers: Mohole project.

Contents: Vessel positioning system (sonar reference systems, shipboard antenna design arrangement and study, electromagnetic interference measurements); Drill pipe; Riser system (riser system stress analysis); Riser support system (underwater gas generator); Downhole drills (retractable diamond core bits and barrels).
PB-175 298 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS REPORT FOR 15 JUNE, 1965.
AMF Tuboscope, Inc., Houston, Tex.
15 Jun 65, 20p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Surfaces), (*Finishes+ finishing, Heat treatment), Signal-to-noise ratio, Defects (Materials), Gamma rays, Backscattering, Construction, Ultrasonic radiation, Detectors.
Identifiers: Mohole project.

Tests were conducted to determine the maximum sensitivity obtainable by electromagnetic inspection. A test sample was prepared from a section of AISI 4130 5-1/2 in. O. D. pipe which contained areas of various surface finishes ranging from 4 R.M.S. to 290 R.M.S. Results of tests made on this sample are shown.
PB-175 299 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS REPORT FOR JUNE 15, 1965.
National Engineering Science Co., Houston, Tex.
15 Jun 65, 35p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Configuration, Drilling, Force (Mechanics), Drag, Buoys, Design, Mathematical analysis, Computer programs.
Identifiers: Mohole project, Casing.

Specific subjects reported upon are: computer program improvements, vertical-transverse coupling, emergency configuration, upper drill string configurations, and bit forces. In the supporting material of the report, clarification of the determination of drag coefficients for low aspect ratio buoys is included. (Author)
PB-175 300 HC$3.00 MF$0.65

PROTOTYPE RETRACTABLE CORE BIT HEAD AND BARRELS.
Project MOHOLE scientific and technical progress rept. for 15 Jun 65,
Christensen Diamond Products Co., Salt Lake City, Utah.
H. C. Bridwell. 15 Jun 65, 69p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Design), Diamonds, Performance (Engineering), Drills, Stresses, Tables, Analysis.
Identifiers: Mohole project.

Analytical studies of the most promising retractable bit designs have produced information which is of major value as we approach the final design and selection of an operable retractable bit system. The project work included primarily design layouts, models and analytical studies. The selection of promising designs has narrowed down now to two retractable systems which are: Three Pad Staggered Floating Pad Retractable Bit - 3PS (FP), Three Pad Staggered Carrier Mounted Pad Retractable Bit - 3PS (CM). (Author)
PB-175 301 HC$3.00 MF$0.65

SUMMARY, SCIENCE AND NAVAL ARCHITECTURE, MARINE ENGINEERING INSTRUMENTATION SECTIONS.
Project MOHOLE scientific and technical progress rept. for 15 Jul 65.
Brown and Root, Inc., Houston, Tex.
31 Jul 65, 18p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Specifications), Instrumentation, Magnetic properties, Power amplifiers, Sea water, Fatigue (Mechanics), Cutting fluids, Drilling machines, Mud, Rock (Geology), Magnetic fields.
Identifiers: Mohole project.

The magnetic susceptibility instrumentation consists of a driving section (highly stable oscillator and a power amplifier with associated driving coil assembly) and a detecting section (detecting coil assembly, detecting amplifier, and phase detector demodulating circuit). In the testing of drill pipe and casing materials, Battelle Memorial Institute has completed a series of corrosion fatigue tests in seawater. The data from these zinc-plating tests confirm qualitatively the ability of this corrosion protection method to function in the presence of abrasion or mechanical damage to the coating. Drilling fluids described in the June 15 Scientific and Technical Progress Report were prepared and sent to Battelle for use in further tests. A testing program for these fluids, outlined at a July meeting with Battelle, will determine the corrosion fatigue performance in the drilling mud with bare specimens and zinc-plated specimens with 1/2-in. holidays. Based upon the scientific recommendations presented to the prime contractor, a development program for measuring the rock magnetic susceptibility and Earth's magnetic field intensity in the Mohole has been undertaken. (Author)
PB-175 302 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress rept. for 15 Jul 65.
Brown and Root, Inc., Houston, Tex.
15 Jul 65, 24p
Contract NSF-C-260
See also PB-175 311

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Structures, Drilling, Pipes, Specifications, Stresses, Control systems, Cutting fluids, Positioning devices (Machinery).
Identifiers: Mohole project.

Contents: Derrick and substructure; Pipe handling equipment (automatic pipe racker); Drill pipe; Riser system (riser system stress analysis, deep submergence blowout preventers); Drilling fluid systems.
PB-175 303 HC$3.00 MF$0.65

STATEMENT OF WORK WITH DRAWINGS AND REFERENCED DATA.
Project MOHOLE scientific and technical progress rept. for 15 Jul 65.
Brown and Root, Inc., Houston, Tex.
15 Jul 65, 93p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Structures, Drilling), Geophysical prospecting, Design, Mechanical drawings, Hoists, Positioning devices (Machinery), Pipes, Anchors (Structural), Drilling machines, Couplings.
Identifiers: Mohole project.

The report presents drawings for the derrick, substructure and special equipment for the Project Mohole floating drilling platform.
PB-175 304 HC$3.00 MF$0.65

CORROSION FATIGUE STUDIES.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 65.

Battelle Memorial Inst., Columbus, Ohio.
2 Jul 65, 11p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Steel, Fatigue (Mechanics)), Corrosion, Stresses, Pipes, Sea water, Experimental data, Crack propagation, Fracture (Mechanics), Impact tests.
Identifiers: Mohole project, Drill pipes.

During June, attention toward completing the corrosion fatigue study using deaerated seawater, determining the impact properties of M-135 steel at 0F, and performing flattening trials on the sections to be used to fabricate the plate specimens for the fatigue crack propagation and fracture studies. Results of early studies on corrosion fatigue indicated that either deaeration was ineffective as a means of improving the corrosion fatigue behavior of the specimen or the water was picking up oxygen during the experiments. Therefore, in the series of studies reported upon here, steps were taken to modify the seawater circulating system to ensure that no oxygen would leak into the system. Results of the tests clearly demonstrate that the fatigue life of the 135-type steel tested in seawater is not improved by removal of oxygen to a level below 0.1 ppm. Results of impact tests performed on M-135 steel at 0F indicate that the impact energy values achieved in the specimens which were tempered at 1200F will meet the values called out in the specifications. However, the specimens which were tempered at 1150F did not exhibit Charpy energy values which would satisfy the specifications. It appears that the energy values achieved are not plateau values; i.e., 0F may be approaching the transition temperature.
PB-175 305 HC$3.00 MF$0.65

NESCO PROGRESS REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 65.
National Engineering Science Co., Pasadena, Calif.
11 Jun 65, 35p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Mechanical properties, Computer programs, Numerical analysis, Drag, Configuration, Damping, Drills, Wear resistance, Drilling.
Identifiers: Mohole project, Casing.

Riser torsion - The significance of riser torsion was investigated by writing the completely general, three-dimensional structural equations and examining the relative magnitude of the significant terms under a variety of conditions. Vertical-transverse coupling - A combination of analytic and experimental (computer) techniques was used to investigate this difficult problem. Numerical analysis techniques - The previously developed implicit computer program, utilizing varying spatial steps, was generalized to permit variable torsion, rigidity, mass, and drag, and was checked out and confirmed. Emergency configuration - A rational method of treating the response to random excitation of a nonlinear damped structure was developed. The improved damping treatment results in significantly lower calculated peak stresses in the emergency configuration. Stresses in upper drill string - Analysis of an upper drill string configuration was performed, and it was found that high stresses result from a rigid power sub and significant clearance between the string and the riser or guide shoe when the power sub is in a low position. Bit wear - Lowering of the drill string within the riser will tend to wear the riser locally. (Author)
PB-175 306 HC$3.00 MF$0.65

HYDRAULIC REQUIREMENTS.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 65.
Brown and Root, Inc., Houston, Tex.
16 Aug 65, 40p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Hydraulic fluids, *Pipes), Drilling, Operation, Cleaning, Cutting tools, Fluid flow, Small tools, Programming (Computers).
Identifiers: Mohole project.

The report provides all known data on fluid systems operational requirements for drilling the Mohole at the Maui site. This information provides the basis for fluid circulatory system pipe and equipment selection.
PB-175 307 HC$3.00 MF$0.65

REPORT ON MAXIMUM TEMPERATURE CONSIDERATIONS.
Project MOHOLE scientific and technical progress for the period ending 15 Jul 65.
Brown and Root, Inc., Houston, Tex.
1965, 17p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Heat transfer, Thermal conductivity, Lithosphere, Igneous rock, Sea water, Temperature, Site selection, Instrumentation.
Identifiers: Mohole project.

One of the environmental problems that must be considered is high temperature. Presently the maximum temperature that will be encountered in drilling the Mohole is not known with any accuracy; however, it is possible that the temperature may reach a value that would be critical for the instrumentation program and perhaps other phases of the Project. Because of the importance of the temperature considerations, an effort has been made to determine the 'best guess' maximum temperature that will be encountered based on available information and test data. If we assume that the heat flow in the crust is by conduction only, that the area under consideration has reached a steady state with respect to thermal activity, that no heat sources exist within the region for which the heat flow is calculated and that the average values of heat flow and thermal conductivity are reasonable, it may be concluded that 200 degrees C. is a reasonable figure for maximum bottom-hole temperature.
PB-175 308 HC$3.00 MF$0.65

SCIENCE SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 65.
Brown and Root, Inc., Houston, Tex.
31 Aug 65, 17p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Marine engineering, Drilling, Sonar equipment, Propellers (Marine), Pipes, Drilling machines, Stresses, Gas generating systems, Marine propulsion, Transducers.
Identifiers: Mohole project, Casing.

Contents: Science; Naval architecture, marine engineering, and instrumentation; Drilling engineering.
PB-175 309 HC$3.00 MF$0.65

NAVAL ARCHITECTURE MARINE ENGINEERING, AND INSTRUMENTATION SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 65.
Brown and Root, Inc., Houston, Tex.
1965, 66p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Propellers (Marine), Marine propulsion, Communication systems, Navigation, Marine engineering, Instrumentation.
Identifiers: Mohole project, Drilling vessels.

Contents: Vessel positioning system; displacement of overside transducer for LBS system, Communications and navigation.
PB-175 310 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 65.
Battelle Memorial Inst., Columbus, Ohio.
1965, 23p
Contract NSF-C-260
See also PB-175 335.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Pipes, Drilling, Stresses, Supports, Gas generating systems, Underwater equipment, Drills.
Identifiers: Mohole project.

Contents: Drill pipe; Riser system (riser system stress analysis, preliminary study of riser stress measurement devices); Riser support system (underwater gas generator, testing of small-scale prototype gas generator); Downhole drills (retractable diamond core bit head and barrels).
PB-175 311 HC$3.00 MF$0.65

A REVIEW OF THE CORROSION, FATIGUE, AND FRACTURE CHARACTERISTICS OF Ti-6Al-4V.
Project MOHOLE special rept,
Battelle Memorial Inst., Columbus, Ohio.
D. W. Hoeppner, W. S. Hyler, and E. White.
1965, 71p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Titanium alloys, Fatigue (Mechanics)), (*Corrosion, Titanium alloys), Stress corrosion, Aluminum alloys, Vanadium alloys, Crack propagation, Toughness, Fracture (Mechanics), Pipes.
Identifiers: Mohole project, Drill pipes, Titanium alloy 6Al 4V.

The report summarizes pertinent information regarding the utilization of a titanium alloy as the drill string material in Project Mohole. Specific topics which are dealt with are related to the fatigue, corrosion, and fracture behavior of the Ti-6Al-4V alloy. Representative data are presented which serve as indicators of the performance which may be expected from the alloy. Having considered the properties of interest to application as a drill string material, the Ti-6Al-4V alloy, if economically producible in the form of 40-to 50-ft lengths of drill pipe, appears to be suitable as a drill string material. Its corrosion, fatigue, and particularly corrosion-fatigue, properties are excellent. There is one potentially dangerous area in the use of the Ti-6Al-4V material which is related to the ability of the titanium base alloys to resist stress corrosion cracking in the presence of a crack. It is recommended that this questionable area be fully evaluated prior to the use of Ti-6Al-4V as the Mohole drill string material. Other experimental studies appear to be necessary also. It is important that the propagation of fatigue cracks in a seawater and drilling mud environment be completely evaluated. Also, the fracture strength of flawed material should be evaluated. Some study of the potential problem of crevice corrosion is necessary. No data were found to exist regarding the axial fatigue behavior at low cyclic rates; therefore, axial fatigue tests should be performed at low cyclic rates in either seawater or drilling mud. (Author)
PB-175 312 HC$3.00 MF$0.65

PROJECT MOHOLE PROGRESS REPORT TO BROWN AND ROOT, INC. JUNE 1, 1965 TO JULY 15, 1965.
AMF-Tuboscope, Inc., Houston, Tex.
27 Aug 65, 7p
Contract NSF-C-260

Descriptors: (*Pipes, *Defects (Materials)), (*Ultrasonic radiation, Non-destructive testing), Detectors, Sensitivity, Drilling machines, Cracks, Zinc, Walls, Electroplating.
Identifiers: Mohole project.

Several demonstrations in tubular goods inspection techniques are described in this report.
PB-175 313 HC$3.00 MF$0.65

RISING CASING STRESS ANALYSIS.
Project MOHOLE scientific and technical progress for the period ending 15 Aug 65.
National Engineering Science Co., Pasadena, Calif.
14 Jul 65, 34p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Computer programs, Bending, Drilling, Force (Mechanics), Drills, Mathematical analysis, Hydrodynamics, Drag, Design.
Identifiers: Mohole project, Casing.

Vertical-transverse coupling - Useful verifications of certain factors which were implicitly assumed in NESCO'S work were established. Computer program improvements - The implicit dynamics program was completed and is ready for use in production runs. Upper riser-guide shoe studies - The combination of riser-guide shoe characteristics to limit bending stresses was determined. Emergency configuration - Results of new quantitative studies indicate peak (1/2 hr) riser forces of 300,000 lb. The significance of these forces can be determined only in light of the significance of vertical-transverse coupling. Upper drill string stresses - The effects of a tapered liner in reducing drill pipe stresses at the power sub were investigated, and it was found that substantial stress reductions may be made. Other methods of stress reduction are now under investigation. Bit wear - Sufficient investigations were made to allow confidence that the most critical conditions have been included in the investigations. Results have continued to show low contact forces. (Author)
PB-175 314 HC$3.00 MF$0.65

UNDERWATER GAS GENERATOR.
Project MOHOLE progress rept. no. 8, 1 Aug-31 Aug 65,
Westinghouse Electric Corp., Sunnyvale, Calif.
A. E. Patterson. 9 Sep 65, 31p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Gas generating systems, Underwater), (*Floats, Buoyancy), Buoys, Jatos, Coolants, Valves, Firing circuits, Propellants, Exhaust gases, Pipes, Materials.
Identifiers: Mohole project.

The first single-unit full-scale prototype underwater gas generator test firing was conducted at San Francisco Nav Shipyard on August 2, 1965. As a result of this firing, certain hardware modifications were made at Sunnyvale, and hardware was returned to SFNS for resumption of testing. The modified hardware was successfully fired September 2, 1965. Simulated site tests of the multiple-unit small-scale prototype gas generator were successfully completed at Lake Tahoe, California, August 28, 1965. A report of test results will be prepared and submitted to Brown and Root. Plans for future action include third, fourth, and fifth firings of the single-unit full-scale prototype and final reports on the testing of both prototypes.
PB-175 315 HC$3.00 MF$0.65

WIRELINE RETRACTABLE DIAMOND CORE BIT HEAD AND BARRELS.
Project MOHOLE scientific and technical progress for the period endning 15 Aug 65.
Christensen Diamond Products Co., Salt Lake City, Utah.
Jul 65, 89p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Design), Diamonds, Pipes, Drills, Mechanical drawings, Telemeter systems, Diagrams, Costs, Tables.
Identifiers: Mohole project.

A wireline retractable diamond core bit applicable for coring the Mohole has been designed. This retractable coring bit system has been designed specifically to recover a two-inch diameter core 30-feet long when drilling a 9-7/8-inch diameter hole and tripping the retractable mechanism on wireline through the bore of four-inch inside-diameter drill pipe. The retractable diamond core bit is set into coring position and is later retracted using only a wireline. The wireline retracting and setting feature reduces the need for costly, slow round trips with the drill pipe to change bits. With this system, bits can be changed in 2 hours instead of 20. The system can be rotated below a turbodrill or by conventional rotary drive. The retractable core bit system consists of three diamond-set bit pads which are tripped as an assembly through the inside bore of the drill pipe, with the pads staggered one above the other. The pads are suspended from a carrier barrel on rods which space the pads in their proper running-in position. Each pad is pushed by cam-like actions into position for coring as it reaches the bottom of the drive mandrel. The drive mandrel is threaded onto the bottom drill collar in the hole. The carrier barrel and inner barrel are slipped into position behind the pads to lock the pads in place before the coring operation begins. The bit is automatically retracted from the hole for inspection each time the core barrel is tripped out on the wireline. Theoretical studies of various possible Mohole coring systems have been completed with the results showing a major economic and time savings by using the combination of this retractable bit and a four-inch bore turbodrill for drilling the Mohole. (Author)
PB-175 316 HC$3.00 MF$0.65

SUMMARY AND PAPERS ON PROJECT MOHOLE, INTERNATIONAL SYMPOSIA, OTTAWA (CANADA) SEPTEMBER 2-11, 1965.
Project MOHOLE progress rept. for 15 Sept 65.
Brown and Root, Inc., Houston, Tex.
30 Sep 65, 64p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Symposia), Pipes, Sea water, Fatigue (Mechanics), Steel, Measurement, Instrumentation, Generators, Underwater, Cracks, Fracture (Mechanics), Corrosion, Site selection, Weather, Diamonds, Buoyancy, Cutting fluids.
Identifiers: Mohole project.

Contents: Papers on project Mohole delivered before the international upper mantle symposia - Ottawa, Canada; Naval architecture, marine engineering, and instrumentation; Drilling engineering. (Author)
PB-175 317 HC$3.00 MF$0.65

SCIENCE SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 65.
Brown and Root, Inc., Houston, Tex.
1966, 23p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Cables (Mechanical), Voltage, Circuits, Transducers, Design, Calibration, Machine tools, Tests.
Identifiers: Mohole project.

Three progress reports are included here, covering progress during July, August, and September in Phase II of Subcontract 64-64, the development and fabrication of a field prototype downhole tension device. Transformer design data and results of the voltage breakdown tests are given in Reports TM 1686 and TM 1695. The latter report describes and illustrates the manner in which the strain transducers are mounted on the tension member, referred to as the weak point of the cable head assembly. Report TM 1704 reports data on the most recent tests performed on the experimental bifilar transformer windings and also includes a curve depicting the results of load test on the strain element. (Author)
PB-175 318 HC$3.00 MF$0.65

NAVAL ARCHITECTURE, MARINE ENGINEERING, AND INSTRUMENTATION SECTION. DRILLING SECTION.
Project MOHOLE scientific and technical progress for period ending 15 Sep 66.
Brown and Root, Inc., Houston, Tex.
1966, 16p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Analysis, Propellers (Marine), Marine propulsion, Acoustic equipment, Position finding, Gas generating systems.
Identifiers: Mohole project, Casing.

Contents: Vessel positioning system; Drill pipe; Riser system; Riser support system.
PB-175 319 HC$3.00 MF$0.65

WHIP OF DRILL PIPE IN OPEN SEA DRILLING WITHOUT RISER.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 66.
Brown and Root, Inc., Houston, Tex.
1966, 42p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Drilling, Motion, Ocean waves, Mathematical analysis.
Identifiers: Mohole project.

The study was undertaken with the purpose of taking into account the variation of tension with depth and thus obtaining a better estimate of stresses produced by whip of the drill pipe.
PB-175 320 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING SEPTEMBER 15, 1965.
Battelle Memorial Inst., Columbus, Ohio.
1966, 9p
Contract NSF-C-260
See also PB-175 329.

Descriptors: (*Well logging, Feasibility studies), (*Steel, Fracture (Mechanics)), (*Fatigue (Mechanics), Steel), Hydrogen embrittlement, Stress corrosion, Toughness, Crack propagation, Pipes, Drilling, Cutting fluids, Sea water, Corrosion, Zinc, Plating, Corrosion inhibition.
Identifiers: Drill pipes, Mohole project.

In hydrogen studies, both zinc-electroplated and unplated specimens of AMS 6427 steel were loaded to a stress of 135,000 psi (based on the notched cross section) and exposed to flowing, fresh seawater for over 500 hours. None of the specimens failed during the predetermined runout time for the exposure tests. Subsequent tests in a tensile machine after baking to remove hydrogen did not reveal any significant hydrogen damage. The evaluation of the Charpy V-notch impact behavior of the M-135 steel tempered at 1150 F and 1200 F was completed during August. The impact energy values at 0 F of the material which was tempered at 1150 F are below the values called out in the specifications. Consequently, if the values in the specifications are taken as firm values, the 1150 F temper will not be suitable. Additional experimental work on the evaluation of the fatigue behavior of the 135-type steel in the drilling muds was undertaken during August. To aid in the evaluation of the fatigue results, biological assays were performed upon receipt of the drilling fluids and regularly thereafter. A check was made for the presence of sulfate-reducing bacteria according to API procedure. A discrepancy, for which at pre-

sent no explanation exists, was found between the results of the assays performed by Battelle and those performed by Baroid. Crack propagation tests to determine the influence of tempering temperature on the fatigue crack propagation behavior of M-135 steel have been completed. The data show that the specimens which were tempered at 1200 F possess better fatigue crack propagation characteristics than those which were tempered at 1150 F. (Author)
PB-175 321 HC$3.00 MF$0.65

DRILL PIPE FATIGUE TEST MACHINE. DESCRIPTION AND PROCEDURES FOR MAINTENANCE AND OPERATION.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 65.
Budd Co., Philadelphia, Pa.
H. M. Russell-French. 31 Aug 65, 80p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Fatigue (Mechanics), Specifications, Design, Maintenance, Hydraulic systems, Measurement, Tensile properties, Operation.
Identifiers: Mohole project.

The Budd Company was commissioned by Brown and Root to review the conceptual design of a 1,200,000-lb-capacity machine for tensile fatigue testing drill pipe and to make final design recommendations and prepare production drawings and specifications for the manufacture, erection, and operation of the test machine. The final report on the performance analysis of the drill pipe fatigue test machine has now been submitted. The report is in two parts: Drill pipe fatigue test machine, description and procedures for maintenance and operation, and drill pipe fatigue test machine load measurement. (Author)
PB-175 322 HC$3.00 MF$0.65

DRILL PIPE FATIGUE TEST MACHINE LOAD MEASUREMENT.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 65,
Budd Co., Philadelphia, Pa.
H. M. Russell-French. 31 Aug 65, 16p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Strain gages, Detectors, Specifications, Calibration, Instrumentation, Fatigue (Mechanics), Recording systems, Circuits, Electric wire, Transducers.
Identifiers: Mohole project.

Contents: Transducer, (General, load link assembly, strain gauge bridge, protective cover, summary of specifications); Instrumentation, (General, recorder, wire-type rupture detector, load rupture detector); Calibration. (Author)
PB-175 323 HC$3.00 MF$0.65

NESCO PROGRESS REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 Sep 65.
National Engineering Science Co., Pasadena, Calif.
1965, 29p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Pipes, Torsion, Motion, Joints, Design, Drilling, Drills, Stresses.
Identifiers: Mohole project.

Progress was made on the following subjects: Riser torsion, vertical-transverse effects, angle time-history, upper riser-guide shoe, slip-joint designs, upper drill string, drilling without riser, and bit wear.
PB-175 324 HC$3.00 MF$0.65

UNDERWATER GAS GENERATOR.
Project MOHOLE progress rept. no. 9, 1 Sep-30 Sep 65,
Westinghouse Electric Corp., Sunnyvale, Calif.
A. E. Patterson. 11 Oct 65, 11p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Generators, Underwater), Pipes, Manifolds (Engines), Tests, Design.
Identifiers: Mohole project.

Single unit full scale prototype firings were completed at San Francisco Naval Shipyard. The final test results report for the simulated site working conditions test was submitted. Four additional test firings were completed at SFNS. A total of (5) firings have now been completed with the full scale prototype. The test results report for the five tests completed through September 15, 1965 will be submitted in October. Five additional tests will be conducted at SFNS in October to determine the effects of manifold flooding. (Author)
PB-175 325 HC$3.00 MF$0.65

SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING OCTOBER 15, 1965.
Project MOHOLE summary rept.
Brown and Root, Inc., Houston, Tex.
1965, 9p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Fatigue (Mechanics), Cracks, Instrumentation, Thickness, Cutting fluids, Tensile properties, Sensors, Pressure, Magnetic properties, Intensity, Generators, Stability, Fluids, Motion.
Identifiers: Mohole project.

Of prime importance to the susceptibility measurement is the presence of a highly stable frequency generator. A base oscillator circuit design has evolved and has been operated at various temperatures from room temperature to 200 C. Heave measurement by pressure sensors constitutes a portion of the instrumentation program for developing the vessel heave sensor system. By use of two pressure transducers, one located at each end of the Mohole drilling platform, heave can be detected. In the testing of drill pipe, Battelle Memorial Institute is studying fatigue crack propagation in air using partial thickness starter cracks in a 4330 modified material heat treated to a tensile strength of 165,000 psi. These tests were designed to determine the effects of mean stress and section thickness on propagation rate. Corrosion fatigue tests are continuing at Battelle as outlined in previous reports. A report on the dynamic stress analysis of drill pipe for longitudinal motion is the result of a study of the effects due to changes in sizes of pipe in a tapered string, damping properties due to fluid circulation, and the different damping properties due to lighter and heavier fluids with respect to drill pipe stresses and displacement at the bumper sub. (Author)
PB-175 326 HC$3.00 MF$0.65

SCIENCE SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 65.
Brown and Root, Inc., Houston, Tex.
1965, 100p

Descriptors: (*Well logging, Feasibility studies), (*Electronic equipment, Measurement), Magnetic properties, Instrumentation, Sensors, Intensity, Power amplifiers, Generators, Circuits, Oscillators, Temperature, Stability, Diagrams, Maps, Pressure, Transducers.
Identifiers: Mohole project.

Contents: Electronic measurements; (Rock magnetic susceptibility and magnetic field intensity instrumentation, heave measurement by pressure sensors, downhole logging cable tension device, logging equipment evaluation at Uvalde). (Author)
PB-175 327 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 65.
Brown and Root, Inc., Houston, Tex.
1965, 23p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Stresses, Cracks, Drilling machines, Cutting fluids, Thickness, Velocity, Design, Tables, Motion, Frequency, Response, Fluids, Generators, Underwater.
Identifiers: Mohole project.

Studies of fatigue crack propagation in air using partial thickness starter cracks in a 4330 modified material heat-treated to a tensile strength of 165,000 psi have been initiated. This series of tests was designed to determine the effect of mean stress and the effect of section thickness on propagation rate. There are indications in the data that mean stress is not as important a variable in crack propagation rate as the alternating stress and crack length. Methods are now available to determine the maximum bending stresses in the drill pipe, in terms of bending stress or curvature in the riser, for all drill pipe sizes and for varying spacing and stiffness of protectors. The results included in this report demonstrate the effects of parameters usually omitted in the longitudinal motion analysis of systems similar to the drill string problem. The effects due to changes in sizes of pipe in a tapered string, damping properties due to fluid circulation, and the different damping properties due to lighter and heavier fluids were studied with respect to drill pipe stresses and displacement at the bumper sub. The study was made using a harmonic forcing function at the top of the drill string to represent the heaving motion of the drilling platform. The frequencies were varied for each system about the fundamental natural frequency so that not only the maximum response at the peak could be noted, but also the reduction of the amplification at frequencies away from the fundamental frequency. (Author)
PB-175 328 HC$3.00 MF$0.65

FATIGUE CRACK PROPAGATION AND CORROSION FATIGUE.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 65.
Battelle Memorial Inst., Columbus, Ohio.
1965, 17p
Contract NSF-C-260
See also PB-175 336.

Descriptors: (*Well logging, Feasibility studies), (*Steel, *Fatigue (Mechanics)), Crack propagation, Corrosion, Defects (Materials), Pipes, Zinc, Plating, Corrosion inhibition, Cutting fluids, Drilling.
Identifiers: Drill pipes, Mohole project.

Examination was made of the fatigue crack propagation behavior of more massive specimens than employed previously. The objective is to learn how AMS 6427 steel responds to the presence of a small flaw insofar as the fatigue initiation process is concerned and then to the propagation of that fatigue crack as additional stress cycles are applied. Information will thus be gained that will be useful in delineating the behavior of the drill pipe in the event a fatigue crack forms. From the data accumulated so far, the subcontractor reports some interesting tentative comments (not conclusions). Two important facts emerge from the corrosion fatigue tests conducted: (1) Of all the corrosion fatigue control measures evaluated so far, the use of zinc plating has provided the only positive answer. (2) However, there still may be some assistance to be gained by using a proper inhibitor and from the use of a different mud. (Author)
PB-175 329 HC$3.00 MF$0.65

NESCO PROGRESS REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 65.
National Engineering Science Co., Pasadena, Calif.
13 Sep 65, 53p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Torsion, Motion, Equations, Elasticity, Force (Mechanics).
Identifiers: Mohole project Casing.

The effect of torsion on the riser is investigated by formulating and examining the six component equations of three-dimensional motion. Equations of elasticity are also used, and the analysis is based on the assumption of small angles. It is concluded that the torsional stresses induced in the Mohole riser will not be significantly large under the projected operations, and that the presence of 50 kip feet of torque in the drill string will not significantly affect the static or dynamic behavior of the riser. (Author)
PB-175 330 HC$3.00 MF$0.65

NUMERICAL ANALYSIS OF A BEAM UNDER TENSION.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 65.
National Engineering Science Co., Pasadena, Calif.
1965, 22p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Numerical analysis, Deflection, Loading (Mechanics), Beams (Structural), Bending.
Identifiers: Mohole project, Casing.

A finite difference formulation for determining the static deflection and stress configuration of a long beam under tension is presented. The formulation was developed in the course of studies of the 'Mohole' riser, which has a variable tension, section modulus, and horizontal loading and is so long (up to 18,000 ft) that direct solutions could not be found. (Author)
PB-175 331 HC$3.00 MF$0.65

RESPONSE OF A NONLINEAR DAMPED OSCILLATOR TO RANDOM EXCITATION.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 65,
National Engineering Science Co., Pasadena, Calif.
A. W. Bell, and A. E. Galef. 31 Oct 65, 15p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Motion), Stresses, Damping, Oscillation, Nonlinear systems, Response, Mathematical analysis, Probability.

A method for determining the response to random excitation of a simple oscillator with nonlinear damping is developed. As is always the case in random motion, the response is determined in terms of the root-mean-square response and the probability distribution. The probability distribution is found to be markedly different, in the nonlinear case, from the Rayleigh distribution found for the linear case. The effects on the probability of failure of an oscillator may therefore be quite profound even when the mean-square response of the nonlinear oscillator is the same as the response of a otherwise equivalent linear oscillator. (Author)
PB-175 332 HC$3.00 MF$0.65

SINGLE UNIT FULL SCALE PROTOTYPE: TEST AT SAN FRANCISCO NAVAL SHIPYARD; TEST RESULTS REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 Oct 65,
Westinghouse Electric Corp., Sunnyvale, Calif.
A. E. Patterson, and R. Raffaeli. 6 Oct 65, 31p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Generators, Underwater), Carbon dioxide, Pistons, Design, Photographs, Tests, Pressure, Manifolds (Engines), Tables.
Identifiers: Mohole project.

The primary objectives of the full scale tests with the Single Unit Full Scale Prototype Gas Generator are: Demonstration of the workability of the full scale operation; Optimization of the carbon dioxide-gas generator flow areas. The report summarizes the experimental results of the test conducted with the full scale prototype system. (Author)
PB-175 333 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING OCTOBER 15, 1965, TO NOVEMBER 15, 1965, AND NOVEMBER 15, 1965 TO DECEMBER 15, 1965, SUMMARY.
Brown and Root, Inc., Houston, Tex.
Dec 65, 11p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Fatigue (Mechanics), Cracks, Instrumentation, Thickness, Steel, Titanium alloys, Joints, Extrusion, Sea water, Generators, Underwater, Manifolds (Engines), Corrosion, Design.
Identifiers: Mohole project.

In the testing of drill pipe and casing materials at Battelle Memorial Institute, studies of fatigue crack propagation in air, initiated during the last reporting period, have continued. These tests utilize partial thickness starter cracks in a 4330 modified material heat-treated to 165,000-psi tensile strength. The results of the tests tend to support the previous data and indicate a relatively small effect of mean stress on the rate of crack propagation. Corrosion fatigue tests in fresh water mud were reported in which the life in mud was with the scatter band for seawater environments. Work has resumed on the titanium drill pipe extrusion program after a period of labor difficulty. This means that titanium alloy tool joints, compatible with the pipe, should be used. A test firing of the single-unit full-scale prototype underwater gas generator was conducted by Westinghouse Electric Corporation. The basic objective of this flooded manifold firing was to determine whether the water could be safely accelerated out of the manifold without rupturing the manifold and/or affecting gas generator performance. The results were positive and confirm the feasibility of firing the gas generators with the manifold flooded. (Author)
PB-175 334 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING OCTOBER 15-NOVEMBER 15, TO DECEMBER 15, 1965, DRILLING SECTION.
Brown and Root, Inc., Houston, Tex.
Dec 65, 9p
Contract NSF-C-260
See also PB-175 351.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Pipes, Drilling, Stresses, Couplings, Titanium.
Identifiers: Mohole project.

Contents: Drill pipe; Riser system (riser system stress analysis).
PB-175 335 HC$3.00 MF$0.65

FATIGUE CRACK PROPAGATION STUDIES; CORROSION FATIGUE STUDIES; OCTOBER PROGRESS REPORT.
Project MOHOLE scientific and technical progress for the period 15 Oct-15 Dec 65.
Battelle Memorial Inst., Columbus, Ohio.
Dec 65, 13p
Contract NSF-C-260
See also PB-175 344.

Descriptors: (*Well logging, Feasibility studies), (*Steel, Fatigue (Mechanics)), Crack propagation, Corrosion, Cutting fluids, Zinc, Plating, Corrosion inhibition, Pipes, Drilling, Defects (Materials).
Identifiers: Drill pipes, Mohole project.

In fatigue crack propagation studies, tests of the effect of mean stress on the surface-flawed flat specimens were continued. Results tend to support the tentative comment made in the September progress report, that the effect of mean stress in the range 25-75 ksi may not be too important with respect to crack propagation. New corrosion fatigue studies were initiated during this period. Fatigue tests were conducted in the new fresh water mud with an attempt to maintain the pH in the range of 10 to 10.5. The bare specimen tested at room temperature failed at 122,800 cycles, showing no improvement over the previous mud tests. The test conducted in seawater on a bare specimen coated with X-2462 inhibitor showed no improvement over the plain seawater tests. Failure occurred at 212,000 cycles. The 1/4-in.-holiday specimen tested at 200 F in the new mud showed an unexpectedly long fatigue life. Failure occurred after nearly 392,000 cycles. This was longer than the fatigue life of the shorter-lived zinc-plated specimen tested some time ago in seawater at room temperature at the same stress level. Examination of this specimen after testing indicated that there may be a tendency for the zinc plating to peel off of the specimen surface. This could prove to be a serious problem. (Author)
PB-175 336 HC$3.00 MF$0.65

INCREASING THE INITIAL MAKE-UP TORQUE REQUIREMENTS ON TOOL JOINTS USED IN EXTREMELY DEEP HOLE DRILLING.
Project MOHOLE scientific and technical progress for the period 15 Oct-15 Dec 65,
Reed Roller Bit Co., Houston, Tex.
John Finke, Jr. 11 Oct 65, 86p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Joints), Torque, Drilling, Compressive properties, Fatigue (Mechanics), Steel, Titanium.
Identifiers: Mohole project.

Drilling of extremely deep wells such as the Mohole can lead to abnormally high drill string tension and, as a consequence, a loss in tool joint shoulder compression. As in conventional drilling, inadequate shoulder compression leaves the joint in a state of reduced fatigue strength. Raising the initial make-up torque levels should help prevent this weakening effect. A formula is proposed for adjusting make-up torque levels on joints run under extremely high tension. Means of experimentally verifying the formula for steel and titanium tool joints are discussed. Experimental test results for two of the formula parameters, the coefficient of friction and the spring constant ratio, are presented. (Author)
PB-175 337 HC$3.00 MF$0.65

TECHNIQUE AND EQUIPMENT DEMONSTRATIONS OF TUBULAR GOODS INSPECTION.
Project MOHOLE final scientific and technical progress for the period ending 15 Oct-15 Dec 65,
AMF Tuboscope, Inc., Houston, Tex.
R. S. Demecs. 16 Oct 65, 304p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Non-destructive testing, *Pipes), Drilling, Defects (Materials), Deformation, Screw threads, Cracks, Magnetic fields, Gamma rays, Ultrasonic radiation.
Identifiers: Mohole project.

Techniques applicable to the nondestructive inspection of tubular goods to be used during the drilling phase of Project MOHOLE are described. Primarily, modified basic techniques of improved sensitivity were demonstrated, although in certain instances, new methods were devised. Actual hardware was assembled to demonstrate most of the techniques under conditions similar to those known to exist in drilling operations. The report covers four main areas of interest: (1) Platform Drill Pipe Inspection, (2) Platform riser casing inspection, (3) Platform thread inspection, (4) Re-

ceiving inspection. These in turn are divided into subsections, each describing a means of detecting specific flaws and variations in pipe parameters. Recommendations are also made based on past experience and knowledge gained during the contract tenure. (Author)
PB-175 338 HC$3.00 MF$0.65

RISER CASING STRESS ANALYSIS. NESCO PRODUCTION COMPUTER STUDIES.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 65.
National Engineering Science Co., Pasadena, Calif.
1965, 17p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Loading (Mechanics), Mathematical analysis, Computers, Statics, Dynamics.
Identifiers: Mohole project, Casing.

Contents: Static analysis (determination of the quasi-angle at top of riser for various drill string lengths, platform excursions, and velocities; stress at bottom of riser vs. sea bed tension); Dynamic analysis (loads at top of riser, loads at bottom of riser).
PB-175 339 HC$3.00 MF$0.65

PROGRESS IN RISER CASING ANALYSIS. NESCO PROGRESS REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 65.
National Engineering Science Co., Pasadena, Calif.
19 Oct 65, 33p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Supports, Design, Joints, Friction.
Identifiers: Mohole project, Casing.

A study of the effects of a realistically flexible guide shoe has indicated that the effects on the riser are essentially equivalent to the effects of an ideal rigid guide shoe. This conclusion is found for a guide shoe with a simple support at the tip and for a fixed support 30 ft down or for a simple or fixed support 48 ft down. In lower riser design, it was found that sea bed pretension over the range of 20,000-200,000 lb has slight effect upon the total stress at the sea bed. The possibility of unfavorable landing base angles recommends against pretension at the high end or outside of that range. Realistic levels of friction in the cable system of an external harness slip joint are slightly beneficial insofar as stresses at the platform are concerned. Larger values of friction would also benefit the platform stresses but would start to deleteriously affect the curvatures in the neighborhood of the slip joint. The problem of interaction between a guide shoe and an external harness slip joint was solved. Idealized studies of drill string curvatures within the slip joint have indicated that the internal diameter changes associated with an open slip joint do not create serious problems. (Author)
PB-175 340 HC$3.00 MF$0.65

SCIENCE SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 65.
Brown and Root, Inc., Houston, Tex.
1965, 12p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Electronic equipment, Measurement), Motion, Ocean bottom, Sensors, Transducers, Pressure, Accelerometers, Calibration, Specifications, Velocity, Electric cables, Ocean currents, Instrumentation.
Identifiers: Mohole project.

The vessel heave compensator-logging cable (VHC-LC) is a device which will augment the present capabilities of a conventional logging system for operation from a floating platform. This device is to compensate for the relative motion of the logging cable, with respect to the sea floor. An accelerometer mounted in a pressure housing will be attached immediately below the buoy, and below the housing will be attached the 200-ft cable supporting the test fixture containing the pressure transducer. Marine advisers conducted speed calibrations of a Savonius rotor which will be the type used in the buoy system to measure ocean currents. An electrical cable transmitted the sensor output to a multichannel Brush recorder on which the Savonius rotor output was recorded on one channel and a distance indicator mounted to the towing carriage was plotted on the second channel. (Author)
PB-175 341 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 65.
Brown and Root, Inc., Houston, Tex.
1965, 9p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Cracks, Fatigue (Mechanics), Cutting fluids, Manifolds (Engines), Generators, Design, Underwater, Tests.
Identifiers: Mohole project.

Preparation of cylindrical specimens to determine the effect of geometry on crack propagation rate has also been completed, and these tests are scheduled at the conclusion of the rectangular specimens. Corrosion fatigue tests in a typical drilling fluid at 200 degrees F are continuing. Another series of tests to measure the dissolution of the zinc electroplate of the drill pipe in drilling fluid at both room temperature and at 200 degrees F is in process. A report presents the results of the single-unit full-scale prototype firing conducted at the Polaris Test Complex, San Francisco Naval Shipyard. The basic objective of this flooded manifold firing was to determine whether the water could be safely accelerated out of the manifold without rupturing the manifold and/or affecting gas generator performance. (Author)
PB-175 342 HC$3.00 MF$0.65

DESIGN OF DERRICK. PRELIMINARY CALCULATIONS.
Project MOHOLE scientific and technical progress for the period ending 15 Oct-15 Dec 65,
Underwood and Associates, Houston, Tex.
A. C. Underwood. 30 Dec 65, 19p
Contract NSF-C-260
See also PB-175 352.

Descriptors: (*Well logging, Feasibility studies), (*Structures, Drilling), Steel, Structural properties, Loading (Mechanics), Stresses, Fatigue (Mechanics), Design.
Identifiers: Mohole project.

The conclusions are: (1) The investigation is in general concurrence with the figures which were submitted by your firm, 12/28/65, under the title of 'Wind Study' and 'Fatigue Study'. (2) From fatigue and weldability considerations, ASTM A441 steel should be a good choice for the vertical primary support members and bracing where strength is necessary beyond that of A36. (3) All axially loaded connections to these members should be butt welded with full penetration. It is important that no stress risers be allowed to remain in the form of undercut, backup plates, etc. (4) Transversely loaded connections may be of fillet type, preferably double wherever possible. (5) Absence of cracks in the joint areas is very important, because their presence will seriously effect the endurance limit of the joint. Consequently, stipulated pre-heating practice and thorough inspection is mandatory. (6) It may be advisable to purchase selected A441 steel so that the minimum yield can be 50Ksi instead of the stipulated 46Ksi. The design advantage may overcome any additional cost. (7) All structural steel used in this structure should be produced by the basic open hearth or basic electric furnace process to keep phosphorus and sulphur at a minimum. (Author)
PB-175 343 HC$3.00 MF$0.65

FATIGUE CRACK PROPAGATION AND CORROSION FATIGUE.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 65.
Battelle Memorial Inst., Columbus, Ohio.
15 Dec 65, 7p
Contract NSF-C-260
See also PB-175 355.

Descriptors: (*Well logging, Feasibility studies), (*Steel, Fatigue (Mechanics)), Crack propagation, Corrosion, Cutting fluids, Zinc, Plating, Corrosion inhibition, Pipes, Drilling.
Identifiers: Drill pipes, Mohole project.

Specimen preparation has begun on the round specimens for the fatigue crack propagation studies. Final design of the grip system for the round specimens was completed and fabrication of the grips begun. In corrosion fatigue studies, the second 1/4-in.-holiday specimen tested at 200 F in the new fresh-water mud was still running after 1,710,000 cycles, as compared with the first specimen which failed after 392,000 cycles under the same testing conditions. This specimen will be examined at the end of the test to determine whether the zinc plating shows a tendency to peel off of the specimen, a possibility which was indicated by the previous 1/4-in.-holiday specimen. The schematics of the specimens and of the test system being used in the zinc dissolution rate experiment and the apparatus for the zinc-steel potential experiments. (Author)
PB-175 344 HC$3.00 MF$0.65

TITANIUM DRILL PIPE EXTRUSION INVESTIGATION.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 65,
Harvey Aluminum, Inc., Torrance, Calif.
H. L. Gilbert. 15 Dec 65, 5p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Titanium alloys, Lubrication, Steel, Extrusion, Tests.
Identifiers: Mohole project.

In the titanium drill pipe extrusion investigation in progress at Harvey Aluminum, extrusion work to date has not shown optimum benefits of the steel clad billets because of lubrication failure. As a result of a meeting in November with personnel of Brown and Root and Battelle Memorial Institute, a test was set up to clarify the lubrication matter. The test program, whose purpose is determination of optimum lubrication to the point that the full-scale Mohole extrusion can be scheduled, is set forth in this report. (Author)
PB-175 345 HC$3.00 MF$0.65

SINGLE-UNIT FULL-SCALE PROTOTYPE UNDERWATER GAS GENERATOR TEST FIRING,
Project MOHOLE scientific and technical progress for the period ending 15 Dec 65,
Westinghouse Electric Corp., Sunnyvale, Calif.
A. E. Patterson, and R. C. Raffaeli. 30 Dec 65, 20p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Generators, Underwater), Carbon dioxide, Instrumentation, Design, Manifolds (Engines), Pipes, Water, Transducers.
Identifiers: Mohole project.

The report presents the results of the single-unit full-scale prototype firing conducted at the Polaris Test Complex, San Francisco Naval Shipyard, on October 27, 1965. The primary objective of the test was to determine the feasibility of firing the full-scale prototype with a flooded manifold; this objective was accomplished. Under severe operating conditions, the manifold did not rupture, and no effect on gas generator operation was detected. Test results show that it will not be necessary to furnish an isolation valve between each module and the manifold in the final underwater system. However, a means will be provided to isolate the buoy inlet pipe from the manifold when replacing modules underwater. (Author)
PB-175 346 HC$3.00 MF$0.65

AUTOMATIC PIPE RACKING SYSTEM.
Project MOHOLE scientific and technical progress for the period ending 15 Dec 65,
Saturn Electronics Corp., Garland, Tex.
H. V. Moore. 11 Jan 66, 7p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Control systems), Design, Hoists, Booms, Automatic, Structural properties, Computers.
Identifiers: Mohole project.

In the first monthly progress report since award of the subcontract, Saturn Electronics Corporation reports that three major tasks have been started. These are a structural analysis and dynamic analysis of the four pipe hoist booms and the design of the control system. (Author)
PB-175 347 HC$3.00 MF$0.65

NAVAL ARCHITECTURE, MARINE ENGINEERING AND INSTRUMENTATION SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 66.
Brown and Root, Inc., Houston, Tex.
31 Jan 66, 8p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Propellers (Marine), Position finding, Pipes, Drilling machines, Stresses, Steering, Marine propulsion, Marine engineering.
Identifiers: Mohole project.

Contents: Naval architecture, marine engineering and instrumentation; Drilling engineering.
PB-175 348 HC$3.00 MF$0.65

DESIGN REPORT STAGE A POSITIONING UNITS.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 66.
Brown and Root, Inc., Houston, Tex.
15 Jan 66, 26p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Propellers (Marine), Design), Marine propulsion, Steering, Ships, Floats, Drilling machines, Model tests.
Identifiers: Mohole project.

It is concluded that the right angle drive positioning unit described in the report is best suited for Project Mohole requirements based on the design, installation, cost, delivery, project schedule, and anticipated maintenance. (Author)
PB-175 349 HC$3.00 MF$0.65

EXHIBITION A: SPECIFICATION FOR CONSTRUCTION OF THE POSITIONING UNITS FOR PROJECT MOHOLE FLOATING DRILLING PLATFORM.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 66.
Brown and Root, Inc., Houston, Tex.
7 Dec 65, 59p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Propellers (Marine), Specifications), Design, Structural parts, Nozzles, Instrumentation, Floats, Drilling machines, Marine propulsion, Steering, Marine engines, Lubrication.
Identifiers: Mohole project, Drilling vessels.

Contents: Intent of specification and plans; Description and general requirements; Design data; Equipment to be supplied; Structural design; Machinery arrangement; Gears, bearings and shafts; Propeller and nozzle; Seals; Lubrication systems; Compressed air systems; Hold down clamps; Propeller drive motor; Auxiliary motors and controllers; Cabling and cable connectors; General description of positioning control system; Instrumentation; Hoisting and handling fixtures and in-transit supports; Dummy mounting structure; Testing requirements; Special tools; Drawings and design calculations; Painting and preservation.
PB-175 350 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING JANUARY 15, 1966, DRILLING SECTION.
Brown and Root, Inc., Houston, Tex.
30 Jan 66, 9p
Contract NSF-C-260
See also PB-175 360.

Descriptors: (*Well logging, Feasibility studies), (*Drilling machines, Geophysical prospecting), Structures, Drilling, Pipes, Stresses, Positioning devices (Machinery).
Identifiers: Mohole project.

Contents: Derrick and substructure; Pipe handling system (automatic pipe racker); Drill pipe; Riser system (riser system stress analysis).
PB-175 351 HC$3.00 MF$0.65

PROGRESS REPORT FOR JANUARY 1, 1966, THRU JANUARY 31, 1966.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 66,
Pyramid Derrick and Equipment Corp., Houston, Tex.
Ray W. Hester, Jr. 31 Jan 66, 6p
Contract NSF-C-260
See also PB-175 343.

Descriptors: (*Well logging, Feasibility studies), (*Structures, Drilling), Steel, Fatigue (Mechanics), Design, Structural properties, Stresses.
Identifiers: Mohole project.

The objectives were to complete preliminary studies regarding derrick and substructure member locations and connections; to finish, basically, the preliminary structural design; and to have some isolated design problems finished in order to begin drawings.
PB-175 352 HC$3.00 MF$0.65

AUTOMATIC PIPE RACKING SYSTEM.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 66.
Saturn Electronics Corp., Garland, Tex.
Jan 66, 6p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Design), Circuits, Hoists, Booms, Structural properties, Resonance, Control systems, Computers.
Identifiers: Mohole project.

The subcontractor continued work on the preliminary design effort in the areas of logic and programming, servo control systems, structural analysis, dynamic analysis of the pipe hoist boom, and a study of human factors. Servo systems have been formulated and preliminary system requirements determined. Structural analysis of the pipe hoist boom has continued throughout this period. The computer run required to determine effects on the pipe hoist boom was made. The entire control console has been mocked up and preliminary layouts of various panel configurations made. (Author)
PB-175 353 HC$3.00 MF$0.65

DYNAMIC STRESS ANALYSIS OF DRILL PIPE FOR LONGITUDINAL MOTION (DUE TO HEAVE OF DRILLING PLATFORM).
Project MOHOLE scientific and technical progress for the period ending 15 Jan 66.
Brown and Root, Inc., Houston, Tex.
31 Jan 66, 60p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Pipes), Stresses, Motion, Physical properties, Cracks, Design, Fatigue (Mechanics), Sea water, Effectiveness.
Identifiers: Mohole project, Drill pipes.

The basic structural function of the drill pipe is to satisfactorily withstand a combination of stress components over a specified time duration while drilling ahead and while raising and lowering the drill string. The stresses which can be exerted on the pipe can be classified as time invariant static stress and time varying dynamic stress. The study which follows is concerned with the dynamic behavior of the drill string when it is subjected to the vertical motion of the platform. After considering some maximum effects of the variables in the physical system--such as variation in fluid weight, rate of fluid circulation, and use of more than one pipe size in a drill string--the response for normal drilling conditions is examined. (Author)
PB-175 354 HC$3.00 MF$0.65

FATIGUE CRACK PROPAGATION TESTS; CORROSION FATIGUE TESTING; DECEMBER PROGRESS REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 66.
Battelle Memorial Inst., Columbus, Ohio.
10 Jan 66, 7p
Contract NSF-C-260
See also PB-175 370.

Descriptors: (*Well logging, Feasibility studies), (*Steel, Fatigue (Mechanics)), Crack propagation, Corrosion, Cutting fluids, Zinc, Plating, Corrosion inhibition, Pipes, Drilling.
Identifiers: Drill pipes, Mohole project.

In corrosion fatigue testing, the second 1/4-in. holiday specimen tested at 200 F in the new fresh water mud (pH = 10-10.5; maximum stress = 120 ksi; mean stress = 75 ksi) did not fail after 2,000,000 cycles. Examination of the specimen after 25 days of testing showed that the zinc was still adhering to the surface. The report presents the results obtained (to the end of the reporting period) for the zinc dissolution rate tests conducted at 200 F and at room temperature. The tests are continuing. The steady state results of the zinc-steel potential experiments are given. Subsequent experiments indicated that the low values found are related to the residual polarization effects carried over from previous temperatures. This was shown by resurfacing a set of specimens and repeating the same test over a period of time. In what is believed to be a more realistic experiment, the zinc was coupled to the steel and tested at 200 F to represent conditions in service. The initial potential difference was 559 mv. As the samples polarized, the potential dropped to 320 mv after 115 min and stabilized.
PB-175 355 HC$3.00 MF$0.65

TITANIUM DRILL PIPE EXTRUSION INVESTIGATION.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 66,
Harvey Aluminum, Inc., Torrence, Calif.
H. L. Gilbert. 12 Jan 67, 6p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Titanium alloys, Lubrication, Steel, Extrusion, Tests.
Identifiers: Mohole project.

An extrusion test was conducted to evaluate lubrication and cladding variables. The work was done on a 3850-ton press in extruding a nominal 9-in. billet to a tube nominally 3.725-in. OD by 0.262-in. wall. Data gained on this size are applicable to the full-size Mohole pipe on a larger press. All extrusions were run as planned, and press operation was normal. All extrusions had excellent ID not comparable to previous work. No container-billet sticking was noted. Proper fit-up of the nose cone and the container was not achieved, apparently because of belling of the front end of the container. The nose cone was made as large as could be inserted through the rear of the container, actually requiring mechanical forcing to enter it; but, upon reaching the larger part of the container near the die, the nose cone was expanded and, in most cases, split by the billet forces. The billet extruded in each case with a certain amount of disturbance of metal flow caused by the deformed or split nose cone. In each case, the steel jacket failed near the front end of the extrusion, at least down one side, with some damage to the enclosed titanium. It is felt that parts of each tube will be typical of the desired process and that the conditions for lubrication and extrusion of clad billets have been achieved. (Author)
PB-175 356 HC$3.00 MF$0.65

REVISED DESIGN DOSSIER FOR RISER SYSTEM.
Project MOHOLE scientific and technical progress for the period ending 15 Jan 66.
Brown and Root, Inc., Houston, Tex.
21 Feb 66, 89p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Design), Stresses, Buoyancy, Configuration, Drilling, Oceanology, Ships, Floats, Hydrodynamics, Propellers (Marine).
Identifiers: Mohole project, Casing.

Contents: General description of riser system; Design configurations and boundary conditions; Riser design details; Buoyancy; Drilling methods, tools and equipment; Oceanography; Drilling platform motions and maneuvers.
PB-175 357 HC$3.00 MF$0.65

NAVAL ARCHITECTURE, MARINE ENGINEERING AND INSTRUMENTATION SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Feb 66.
Brown and Root, Inc., Houston, Tex.
28 Feb 66, 8p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Antennas, Drilling, Pipes, Drilling machines, Systems engineering, Management planning, Communication systems, Navigation.
Identifiers: Mohole project.

Contents: Naval architecture, marine engineering and instrumentation; Drilling engineering; Logistics and operations; Communications and navigation.
PB-175 358 HC$3.00 MF$0.65

DRILLING PLATFORM ANTENNA DESIGN AND ARRANGEMENT STUDY. STAGE A REPORT.
Project MOHOLE final rept. for the period ending 15 Feb 66.
Chu Associates, Littleton, Mass.
12 Mar 66, 160p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Ship antennas, Design), Drilling, Very high frequency, Reliability, Antenna radiation patterns, Navigational aids, Radio communication systems, Propagation, Performance (Engineering).
Identifiers: Drilling vessels, Mohole project.

A study was made to provide an antenna system design for the Mohole drilling platform and VHF shore station sites. The program included theoretical investigations and feasibility studies to determine propagation characteristics, expected communication ranges and reliabilities, and to specify frequency allocations desired for the various required circuits. Results of these engineering investigations were analyzed and used in formulating an antenna system which will provide optimum operational performance at minimum cost. These analyses were supplemented, and results verified, by an extensive electronic scale-model testing program which included measurement of horizontal and vertical plane antenna impedances. The results of this program are summarized in this report. Types and quantities of antennas are specified, together with their recommended mounting locations aboard the platform and at the shore sites. Recommended methods of equipment interconnection and required ancillary system components are specified. Numerous engineering curves, analyses and radiation patterns are included to illustrate the expected system performance. (Author)
PB-175 359 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Feb 66.
Brown and Root, Inc., Houston, Tex.
1966, 40p
Contract NSF-C-260
See also PB-175 396.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Fatigue (Mechanics)), Drilling, Stresses, Crack propagation, Steel, Zinc, Corrosion inhibition, Titanium alloys, Corrosion.
Identifiers: Mohole project, Drill pipes.

Contents: Drill pipe; Riser system (riser system stress analysis).
PB-175 360 HC$3.00 MF$0.65

RISER SYSTEM STRESS ANALYSIS STATUS REPORT AND STAFF COMMENTS.
Project MOHOLE scientific and technical progress for the period ending 15 Feb 66.
National Engineering Science Co., Pasadena, Calif.
Mar 66, 42p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Design, Management planning, Drilling, Floats.
Identifiers: Mohole project, Casing.

The overall feasibility of the riser concept for Project Mohole was established and basic design parameters were determined. A reasonable design of the riser system was selected.
PB-175 361 HC$3.00 MF$0.65

STRUCTURAL DYNAMIC ANALYSIS OF THE RISER AND DRILL STRING FOR PROJECT MOHOLE. PART I. GENERAL.
Final rept.
National Engineering Science Co., Pasadena, Calif.
Jan 66, 170p
Contract NSF-C-260
See also PB-175 363, Part 2.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Drilling, Motion, Design, Drilling machines, Drag, Mathematical analysis, Floats.
Identifiers: Mohole project, Casing.

Techniques for analyzing the overall and local motions and stresses of a riser and drill string for deep water drilling operations were developed and refined. The techniques were employed to make detailed studies of the riser system for the Mohole Program. A riser and drill string designed to reflect the findings of the analysis may be expected to be near the optimum system, and to have an amply long life in operations. (Author)
PB-175 362 HC$3.00 MF$0.65

STRUCTURAL DYNAMIC ANALYSIS OF THE RISER AND DRILL STRING FOR PROJECT MOHOLE. PART II. COMPUTER PROGRAMS.
Final rept.
National Engineering Science Co., Pasadena, Calif.
Dec 65, 203p S-234
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Stresses), Drilling, Dynamics, Differential equations, Computer programs, Motion, Drilling machines.
Identifiers: Mohole project, Casing.

The differential equations describing the motions and stresses of the Mohole riser and drill string are nonlinear, and contain coefficients that vary in both time and space. It was therefore necessary to resort to digital computers to solve them. The computer programs that were developed for solution of equations are presented in sufficient detail that they may be employed by anyone skilled in FORTRAN to reproduce or extend the results presented in Part I (PB-175 362) of the report. (Author)
PB-175 363 HC$3.00 MF$0.65

DRILLING CIRCULATING PUMP SYSTEM REPORT.
Project MOHOLE scientific and technical progress for the period ending 15 Feb 66.
Brown and Root, Inc., Houston, Tex.
15 Feb 66, 42p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pumps, Drilling), (*Cutting fluids, Pumps), Centrifugal pumps, Costs, Reciprocating pumps, Performance (Engineering).
Identifiers: Mohole project.

A survey was made of available pumps, as well as proposals received from manufacturers, to determine which pumps could most readily be adapted to Mohole requirements. Because of the severity of the pressure requirements, duplex type pumps were found inadequate and then it appeared that plunger type reciprocating pumps would have to be used exclusively. These pumps involve high costs of expendable parts and fluid ends. However, the survey reveals that centrifugal pumps could be substituted for a part of the pumping requirements, with resulting large savings. The survey reaffirms the belief that plunger type reciprocating pumps must be used for the remaining requirements. More specifically, centrifugal pumps are recommended for a part of the salt water pumping and Halliburton HT-400D triplex pumps are recommended for mud pumping and supplemental salt water pumping. The survey also indicates that tests are required to evaluate and improve life of expendable parts and to develop and evaluate modifications designed to reduce expendable wear. It is concluded that a combination of centrifugal pumps and modified Halliburton pumps, supplemented with sufficient standbys, and with the recommended test results incorporated, will meet Mohole requirements. However, a high rate of cost of triplex expendable parts, greater than the initial cost of the Halliburton pumps, must be expected. (Author)
PB-175 364 HC$3.00 MF$0.65

LOGISTICS AND OPERATIONS.
Project MOHOLE scientific and technical progress for period ending 15 Feb 66.

Brown and Root, Inc., Houston, Tex.
1965, 107p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Management planning, Transportation, Operation, Warehouses, Helicopters.
Identifiers: Mohole project.

Two studies (Mohole Operations, and An Engineering Appraisal of Transportation) define the current logistical and operational requirements for five phases (RFS, IST, Transit, IDP, and Mohole) of the program. These reports make recommendations for the selection of craft, material and facilities to meet the requirements in the safest and most economical manner. Briefly, the results of these investigations show that West Coast warehouse facilities are recommended for the RFS, IST, and POM (if required) phases. Two large helicopters (S-61N) and one 165-ft (length) supply vessel were recommended to meet the transportation criteria for IDP and Mohole support. (Author)
PB-175 365 HC$3.00 MF$0.65

PROJECT MOHOLE SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD ENDING MARCH 15, 1966.
Brown and Root, Inc., Houston, Tex.
1965, 10p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Sensors, Detection, Transducers, Pressure, Magnetic properties, Design, Sea water, Fatigue (Mechanics), Sedimentation, Cables (Mechanical), Stresses, Cracks, Instrumentation.
Identifiers: Mohole project.

A series of Heave Sensor Tests was conducted in the Gulf of Mexico from a Gulf Oil Corporation platform. A pressure sensor was suspended at various depths, and the data were compared to the curves. At Battelle Memorial Institute, Testing of Drill Pipe and Casing Materials continues with measurement of crack propagation rates in drill pipe material. Specimens of rectangular cross sections containing partial thickness starter cracks were submerged in seawater and subjected to fluctuating loads. The specimens were tested at a constant mean stress but at several alternating stresses. Results indicate that seawater immersion has little effect on the crack length at total failure. A feasibility study for an alternate turbocorer instrument system was made by the Project Mohole staff to point out the need for a back-up means of transmitting and recording (or indicating) at the surface performance of the downhole drilling motors. Such operating characteristics as speed of rotation, core in barrel, bearing wear, etc., are reported by the instrument package used in conjunction with the turbocorer. (Author)
PB-175 366 HC$3.00 MF$0.65

SCIENCE SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Mar 66.
Brown and Root, Inc., Houston, Tex.
1966, 37p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Sensors, Detection, Transducers, Accelerometers, Steel, Pressure, Magnetic properties, Coils, Voltage, Numerical analysis.
Identifiers: Mohole project.

Prior to the installation of the riser system, present considerations are that output signals from the heave detection sensors will control the operation of the vessel heave compensator for the logging cable. The pressure sensor used was a variable reluctance d-c output differential-type transducer with a pressure range of plus or minus 5 psi. The differential-type transducer was used because it was important to look at very small pressure changes equivalent to 1 in. of vertical movement at various depths. The transducer was mounted with a pressure bottle in a steel frame. The accelerometer was a servo type, manufactured by Dynamic Measurements Company. The data from the float motion, pressure transducer, and accelerometer were recorded on a Westronic Strip Chart Recorder simultaneously. The Scientific and Technical Progress Reports of July, 1965, and October, 1965, reported the activities under way to develop rock magnetic susceptibility and magnetic field intensity instruments. These calculations and comments are concerned only with the sensing apparatus and do not include any considerations of the electronics, cable, or other aspects of the design in the present concept. (Author)
PB-175 367 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress for the period ending 15 Mar 66.
Brown and Root, Inc., Houston, Tex.
1966, 16p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Stresses, Drilling machines, Maintenance, Sea water, Cutting fluids, Instrumentation, Design, Cables (Mechanical), Rotation, Meters, Electric cables, Tests.
Identifiers: Mohole project.

Work has proceeded in the reporting period in the measurement of crack propagation rates in the drill pipe material. All tests were performed on specimens of rectangular cross sections containing partial thickness starter cracks. The specimens were submerged in seawater and subjected to fluctuating loads. Specimens were tested at a constant mean stress but at several alternating stresses. While rates of crack propagation were considerably faster in the seawater environment than in previous air tests, it appears that seawater immersion had little effect on the crack length at total failure. A blowout preventer system is capable of operation at approximately 350 ft below the ocean surface, complete with the control station and manifolding to be located on the drilling platform. A modified turbocorer instrument package is being designed, tested, and fabricated in-house. It is being built to be used with the turbocorer for the 'Drilling Equipment Field Test in Industrial Facilities' program scheduled for the end of 1966. The instrument package contains the necessary instrumentation to provide bumper sub position information and provides the minimum information readout required for drilling. (Author)
PB-175 368 HC$3.00 MF$0.65

CENTRAL HYDRAULIC POWER SYSTEM.
Project MOHOLE scientific and technical progress for the period ending 15 Mar 66.
Brown and Root, Inc., Houston, Tex.
1966, 25p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Cutting fluids, Ocean bottom, Power, Hydraulic systems, Pumps, Maintenance, Costs.
Identifiers: Mohole project.

Phase II of Project Mohole is the drilling of a hole through the crust and into the mantle of the earth. This will be done from a floating platform connected to the 14,000 feet deep ocean floor by a riser pipe which will be a conduit for the drilling fluids and a guide for the downhole equipment. The maximum overall depth of the hole from sea level will be 35,000 feet, and the estimated time required to accomplish the task is three years. Much of the equipment aboard the platform for drilling and other services will be hydraulically driven. Because of the location and schedule of operation of this equipment, a Central Hydraulic System is required for economy, utilization of space, simplification of maintenance and power package redundancy. This can best be achieved by a modular system, in which every pumping unit can be used to supply power to every driven unit and which has sufficient power for normal operation when any single pumping unit is being repaired. (Author)
PB-175 369 HC$3.00 MF$0.65

RESULTS OF SEAWATER CRACK PROPAGATION TESTS, OF ZINC DISSOLUTION EXPERIMENTS, AND DATA ANALYSIS.
Project MOHOLE scientific and technical progress for the period ending 15 Mar 66.
Battelle Memorial Inst., Columbus, Ohio.
1966, 24p SC-64-75
Contract NSF-C-260
See also PB-175 381.

Descriptors: (*Well logging, Feasibility studies), (*Steel, Crack propagation), Fatigue (Mechanics), Corrosion, Sea water, Zinc, Plating, Corrosion inhibition, Pipes, Drilling, Defects (Materials), Stresses, Air.
Identifiers: Drill pipes, Mohole project.

Results of seawater crack propagation tests, of zinc dissolution experiments, and data analysis are presented. Tests were performed on specimens of rectangular cross sections containing partial thickness starter cracks. The specimens were submerged in seawater and subjected to fluctuating loads. Specimens were tested at a constant mean stress but at several alternating stresses. In general, the effect of alternating stress level on crack propagation is the same for the seawater tests as for the air tests. That is, as the alternating stress is increased, the crack growth rate increases at a given crack length. It is clear that environment has no influence on the crack length at fracture. All these failures are of the plane stress-ductile type since the net section stress at fracture is greater than either yield or ultimate strength. The fracture surfaces further demonstrate this point, and fractographs will be presented in the final report. Both the room temperature and 200 F studies of the zinc dissolution rate in the new fresh-water mud have been completed. The results of these experiments indicate that a zinc coating will provide adequate protection to the drill string in the fresh-water drilling mud. On the other hand, the data suggest that more rapid dissolution of the zinc may occur in areas where the mud clings to the pipe surface. (Author)
PB-175 370 HC$3.00 MF$0.65

UPPER RISER BLOWOUT PREVENTER SYSTEM.
Project MOHOLE scientific and technical progress for the period ending 15 Mar 66.
Brown and Root, Inc., Houston, Tex.
1966, 15p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Fluid flow, Control systems), Pipes, Drilling, Valves, Specifications, Gas flow.
Identifiers: Mohole project.

In the event that a gas pocket should be encountered while drilling it could become necessary to take precautionary steps to prevent the gas flow from increasing and causing ejection of the drilling fluid from the riser pipe. An upper riser blowout preventer system with choke and kill lines may be required in order to pack off (either around the drill pipe or in the open riser) and allow remedial measures to be undertaken. This blowout preventer may be used in conjunction with a remotely controlled limited use preventer located at the ocean floor. The upper riser preventer system is to be considered an active working unit directly connected to the drilling vessel by hydraulic power lines, control lines, and choke and kill lines. This system should be capable of quick actuation upon demand at any time desired throughout the three year drilling period. Existing equipment may be utilized for the upper riser blowout preventer system, provided that this equipment meets the requirements set forth in the paper. (Author)
PB-175 371 HC$3.00 MF$0.65

PASSIVE BUOYANCY SYSTEM.
Project MOHOLE scientific and technical progress for the period ending 15 Mar 66.
Brown and Root, Inc., Houston, Tex.
1966, 40p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Buoys, Design), Specifications, Buoyancy, Production, Foams, Flexible structures, Structural shells.
Identifiers: Mohole project.

The objective of the study is to procure one passive buoyancy system to meet the total requirements for 610,000 lbs. net buoyancy between 500 feet and 13,000 feet water depth. The total system may be comprised of one or more types of buoys, and if a combination of types is used separate subcontracts may be awarded for each type of buoy. The tasks involved in the request for proposal are the fabrication and/or procurement of a complete or partial buoyancy system. (Author)
PB-175 372 HC$3.00 MF$0.65

INFLATABLE VARIABLE DISPLACEMENT BUOY.
Project MOHOLE scientific and technical progress for the period ending 15 Mar 66.
Brown and Root, Inc., Houston, Tex.
1966, 11p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Buoys, Design), Pipes, Inflatable structures, Gas generating systems.
Identifiers: Mohole project.

The report discusses the design of an inflatable variable displacement buoy, and design and fabrication of a prototype inflatable variable displacement buoy.
PB-175 373 HC$3.00 MF$0.65

FEASIBILITY STUDY FOR ALTERNATE TURBOCORER INSTRUMENT SYSTEM.
Project MOHOLE scientific and technical progress for the period ending 15 Mar 66.
Brown and Root, Inc., Houston, Tex.
1966, 29p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Instrumentation), Ocean bottom sampling, Pipes, Hydraulic systems, Drilling machines, Rotation, Pressure, Environmental tests, Mechanical drawing, Cutting fluids, Torque, Electric cables, Costs, Maintenance, Telemeter systems.
Identifiers: Mohole project.

For Project Mohole, it was determined that all major procurement actions for downhold equipment would be preceded by the design of a principal drilling tool. The extensive research that followed led to selection of a hydraulic turbine engine for this purpose, which is hereinafter referred to as the 'Turbocorer'. The final product incorporated a retractable core barrel, which will accommodate an instrument package for transmitting operational information to the surface through electric conductors or the hydraulic medium. This tool will be the first of its type in American drilling history to be used specifically for drilling and recovering cores. The Turbocorer, as an axial flow hydraulic turbine, has torque characteristics closely related to rpm. Therefore, adequate surface instrumentation is imperative for the positive control necessary to achieve maximum bit life, penetration rate, and other profitable functions relating to the daily cost of operations. For example, surface control of fluid volume will minimize service and maintenance expense. Thus, a compatible electronic telemetering system was developed concurrent with the design, fabrication, and tests of the Turbocorer. This system consists of a downhole instrument package and related surface equipment. (Author)
PB-175 374 HC$3.00 MF$0.65

SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD MARCH 16, 1966 THRU JUNE 15, 1966.
Project MOHOLE rept.
Brown and Root, Inc., Houston, Tex.
30 Jun 66, 6p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Pipes), Pumps, Electric motors, Cables (Mechanical), Design, Mechanical properties, Cracks, Fatigue (Mechanics), Stresses, Ductility.
Identifiers: Mohole project.

Following the summary are two special reports that review the progress and accomplishments of the Project. The first, entitled 'Project Mohole', was prepared by the staff to reiterate the scientific need and value of the Project; the second report, made by M. Rosenblatt and Son, Inc., at the request of the National Science Foundation, summarizes the contributions of the Project to naval architecture and marine engineering. (Author)
PB-175 375 HC$3.00 MF$0.65

A CURRENT REVIEW OF PROJECT MOHOLE.
Project MOHOLE scientific and technical progress for the period ending 15 Jun 66.
Brown and Root, Inc., Houston, Tex.
1966, 166p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Marine geology, Geophysical prospecting, Drilling, Scientific research, Economics, Reviews, Ships, Floats, Drilling machines, Instrumentation.
Identifiers: Mohole project.

Project status: Confidence level of accomplishment; Scientific need for Project Mohole; Comparison with sedimentary drilling program; Economic, military, and scientific benefits; Status of Project Mohole systems development; Platform construction department. Appendix: What is Project Mohole; Scientific goals and objectives; Sponsoring groups for project; Scientific advancements; The drilling platform; Results to date; Patents and inventions; Benefits to the public; Future plans.
PB-175 376 HC$3.00 MF$0.65

A SUMMARY OF CONTRIBUTIONS TO NAVAL ARCHITECTURE AND OCEAN ENGINEERING.
Project MOHOLE scientific and technical progress rept. for 16 Mar-15 Jun 66.
Rosenblatt (M.) and Son, Inc., New York.
May 66, 59p MR/S-P/CD-1523-3
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Floats, Ships, Drilling machines, Design, Selection, Ocean waves, Ocean currents, Structural parts, Drag, Marine propulsion, Maneuverability, Propellers (Marine), Marine engineering.
Identifiers: Mohole project, Drilling vessels.

Contents: Naval architectural studies (selection of type of vessel); Environmental studies; Motion and wave load studies; Structural design; Resistance; Propulsion; Maneuvering; Positioning system.
PB-175 377 HC$3.00 MF$0.65

SCIENCE SECTION.
Project MOHOLE scientific and technical progress 16 Mar-15 Jun 66.
Brown and Root, Inc., Houston, Tex.
1966, 8p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Cables (Mechanical)), Hydraulic systems, Design, Electronic equipment, Torque, Performance (Engineering), Oils, Tests.
Identifiers: Mohole project.

A two-phase subcontract, No. 65-93, for the design and fabrication of the vessel heave compensator-logging cable has been awarded to The Rucker Company, and the first monthly progress report under Phase I is presented here. Technical effort expended during the reporting period included performance of calculations to confirm that the compensator and hydraulic power units as proposed were accurate concepts, preparation of the PERT network for scheduling all activities required for the Phase I effort, and review of the compensator unit concept with the intent to improve its performance. (Author)
PB-175 378 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress for the period 16 Mar-15 Jun 66.
Brown and Root, Inc., Houston, Tex.
1966, 12p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pumps), Steel, Rotation, Cracks, Thickness, Velocity, Design, Tables, Pipes, Stresses, Generators, Underwater.
Identifiers: Mohole project.

A final recommendation on the flexible couplings which connect each end of the motor to a pump, one left hand and one right hand rotation, is made. The requirement that the flexible mounting supports on the power end of pumps be free to move within controlled limits necessitates the use of a spacer-type coupling, with a relatively long spacer, to reduce the angularity of displacement on the coupling to tolerable limits. Testing continued in fatigue crack propagation and two additional specimens were completed. Crack length measurements defining fatigue crack growth were made periodically as the crack was enlarged. The technical portion of the work done by NESCO on riser stress analysis was completed on November, 1965, and the final reports submitted in February, 1966. The results given in the Final Report (presented in graphical form) are being extensively used in the development and design of various pieces of hardware. At San Francisco Naval Shipyard in April, Westinghouse Electric Corporation conducted (under SC 64-46) a series of tests on the prototype underwater gas generator. (Author)
PB-175 379 HC$3.00 MF$0.65

SHAFT AND COUPLING REPORT FOR WESTINGHOUSE 1000 HP D-C MOTORS.
Project MOHOLE scientific and technical progress for the period 16 Mar-15 Jun 66.
Westinghouse Electric Corp., Sunnyvale, Calif.
1966, 28p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Shafts, *Couplings), Standardization, Machines, Electric motors, Pumps, Design, Tables.
Identifiers: Mohole project.

The purpose of this report is to recommend standardized shafts, connections, and as far as possible, standardized couplings to connect twenty identical DC motors with five types of machinery drives. Standardization is desired to reduce spares and permit interchanging parts. (Author)
PB-175 380 HC$3.00 MF$0.65

CRACK PROPAGATION STUDIES.
Project MOHOLE scientific and technical progress for the period 16 Mar-15 Jun 66.
Battelle Memorial Inst., Columbus, Ohio.
1966, 24p
Contract NSF-C-260
See also PB-175 370.

Descriptors: (*Well logging, Feasibility studies), (*Steel, Crack propagation), Fatigue (Mechanics), Air, Corrosion, Zinc, Plating, Corrosion inhibition, Pipes, Drilling, Stresses, Sea water, Defects (Materials).
Identifiers: Drill pipes, Mohole project.

Two fatigue crack propagation tests were conducted. Results for these two specimens are presented.

Also shown in tabular form are the values of crack length vs. number of cycles, a summary of cycles at the stress levels used to develop a propagating crack in each of the specimens, and final fracture data. For both specimens, the net section fracture stress was above ultimate. Other tables present a summary of number of cycles to reach various reference crack lengths and crack propagation rates at various reference crack lengths. These data can be compared to the data summary given in the February progress report. Two figures were prepared to show the results for the two specimens compared to results presented previously. It appears that thickness has no appreciable effect on crack propagation and may, in fact, provide slower crack propagation rates as the thickness is increased. In any event, it is becoming more evident that thicker specimens do not result in higher fatigue crack growth rates at a given crack length. Two photomicrographs of the sectioned discs used for the zinc dissolution experiments are presented. Both are of 4-week specimens tested in the room temperature solution. The extent of dissolution can readily be seen in the photomicrographs.
PB-175 381 HC$3.00 MF$0.65

LONGITUDINAL VIBRATIONS OF THE DRILL PIPE WITH THE LANDING BASE AT ITS END.
Project MOHOLE scientific and technical progress for the period ending 16 Mar-15 Jun 66.
Brown and Root, Inc., Houston, Tex.
1966, 43p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Vibration), Stresses, Landing impact, Buckling (Mechanics), Dynamics.
Identifiers: Mohole project.

The longitudinal vibrations of the Mohole drill pipe induced by platform heave were studied extensively using one-dimensional wave propagation theory. The dynamic stresses developed in the pipe were found to be small compared to the static stresses and, consequently, the drill string remains under tension over the entire cycle. Thus, buckling of the string due to heave during normal operating conditions is not likely to occur. During the operation of lowering the landing base at the end of the drill pipe, however, high stresses are developed in the string due to the large mass of the landing base (mass of structure plus virtual mass). Rough calculations of the dynamic stress produced by heave, even under relatively calm-sea conditions, showed that buckling of the string is possible. The purpose of the study is to determine the dynamic stresses induced in the string by heave during the operation of lowering the landing base. The conditions under which buckling does occur and the resulting bending stresses in the string, in the buckled configuration, are investigated. (Author)
PB-175 382 HC$3.00 MF$0.65

RISER-GUIDE SHOE SYSTEM. ANALYTICAL SOLUTION OF STRESS-LOAD TRANSFER FUNCTION.
Project MOHOLE scientific and technical progress for the period 6 Mar-15 Jun 66.
Brown and Root, Inc., Houston, Tex.
1966, 25p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Positioning devices (Machinery)), Stresses, Loading (Mechanics), Transfer functions, Cantilever beams, Mathematical analysis.
Identifiers: Mohole project, Structural guides.
PB-175 383 HC$3.00 MF$0.65

UNDERWATER GAS GENERATOR.
Project MOHOLE progress rept. no. 15, 1 Apr-30 Apr 66,
Westinghouse Electric Corp., Sunnyvale, Calif.
A. E. Patterson. 10 May 66, 9p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Generators, Underwater), Compressed air, Pistons, Carbon dioxide, Pipes, Design, Tests.
Identifiers: Mohole project.

Tests using single unit full scale test hardware and compressed air and Holex small gas generators instead of carbon dioxide and 14DS1000 JATO units, respectively, were conducted to determine whether piston was blocking exit pipe during firing. Two shots were fired with the hardware unmodified after the 2nd carbon dioxide full scale firing, and blockage was observed. A sleeve was installed to keep the piston centered in the pipe and two additional shots were fired, and no blockage was observed. A 5th and 6th full scale firing with the 934J207 configuration and final carbon dioxide hole size are planned to verify the configuration prior to submitting the final test results report and initiating final design. (Author)
PB-175 384 HC$3.00 MF$0.65

LOGISTICS AND OPERATIONS SECTION.
Project MOHOLE scientific and technical progress for the period 16 Mar-15 Jun 66.
Brown and Root, Inc., Houston, Tex.
1966, 17p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Management planning, Drilling, Operation, Time studies, Mathematical prediction, Budgets.
Identifiers: Mohole project.

The report explains the basis from which estimates of drilling time for Project Mohole were derived. First, time distribution requirements were computed on the basis of conditions ascertained from experience and research; that is, without regard for possible interruptions. This estimate is hereinafter referred to as the 'IDEAL' estimate. An estimate for operation under ideal conditions was essential for programming facilities, equipment, etc., but would not suffice altogether as the estimate for project budgeting purposes and vice versa. Therefore, a second computation was accomplished specifically for budget purposes. In estimating time requirements for budget purposes all conditions were included as before, together with due consideration for possible interruptions resulting from equipment malfunction, inclement weather, etc. The latter is referred to as the 'ADVERSE' estimate. Theoretically, a final time-motion curve representing 'actual' operations will appear between the time motion curves representing adverse and ideal conditions. (Author)
PB-175 385 HC$3.00 MF$0.65

SCIENTIFIC AND TECHNICAL PROGRESS FOR THE PERIOD JUNE 16, 1966 THRU SEPTEMBER 15, 1966.
Project MOHOLE final ed.
Brown and Root, Inc., Houston, Tex.
30 Sep 66, 9p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Reports), Drilling machines, Logistics, Measurement, Design, Instrumentation, Cables (Mechanical), Stresses, Propellers (Marine), Motion, Resolution, Strain (Mechanics), Data processing systems.
Identifiers: Mohole project.

The report is the final made of Scientific and Technical Progress of Project Mohole. In the period covered by this report, June 16 thru September 15, 1966, two interim scientific and technical summary reports (copies of which are included in this volume) were issued. A master index of the material published in these thirty volumes of Scientific and Technical Progress Reports has been prepared. Most timely, the index is published in this, the final edition. This index is an alphabetical listing of all subjects contained in the texts and appendices of each published Scientific and Technical Report. Subjects are listed under the primary headings of 'Drilling', 'Logistics and Operations', Naval Architecture', 'Scheduling', 'Scientific', and 'Subcontracts.' (Author)
PB-175 386 HC$3.00 MF$0.65

SUMMARY OF INTERIM SCIENTIFIC AND TECHNICAL PROGRESS JUN 15 THRU JULY 15, 1966.
Project MOHOLE summary rept.
Brown and Root, Inc., Houston, Tex.
29 Jul 66, 77p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Reports), Instrumentation, Strain gages, Cables (Mechanical), Vibration, Antennas, Design, Specifications, Propellers (Marine), Performance (Engineering), Stresses, Mechanical drawing, Diving, Pipes, Acceleration, Tests.
Identifiers: Mohole project.

Contents: Oceanograpahy; Electronic systems; Naval architecture; (machinery, electrical, structural and hull, hydrodynamics, engineering liaison); Development engineering; Drilling engineering. (Author)
PB-175 387 HC$3.00 MF$0.65

SUMMARY OF INTERIM SCIENTIFIC AND TECHNICAL PROGRESS JULY 16 THRU AUGUST 15, 1966.
Brown and Root, Inc., Houston, Tex.
31 Aug 66, 21p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Instrumentation), Sensors, Electric cables, Strain gages, Antennas, Vibration, Drilling machines, Mechanical drawings, Tests.
Identifiers: Mohole project.

The inspection and testing of the DOUDDA System is currently at a standstill because the sensors, which are being coated with an antifouling paint, will not be available until August 15. At this time, the assembly and testing of the system will be continued at Camp Elliott. Modifications on the catamaran and the installation of the antenna have been performed at the originating boatyard in La Jolla, California. The shallow water and deep water proposed tests on the down-pipe electronic package for the sonar reentry system were submitted by General Motors. These proposed tests, which were evaluated and approved with minor additions, were initiated in early August. A second high-temperature test on the electronic portion of the downhole cable tension device was performed. Final drawings have been prepared for the drilling platform strain gauge instrumentation, and a sample of these drawings is attached to this report. Block diagrams, which reflect the equipment that is being procured at this time, have been completed for the drilling platform communications-navigation system. These drawings were included in last month's Interim Scientific and Technical Progress Report as part of the work description of RFP 131. Design is proceeding on an electrically actuated mechanical vibrator to test the Reed switch bumper sub position sensors. (Author)
PB-175 388 HC$3.00 MF$0.65

SCIENCE SECTION.
Project MOHOLE scientific and technical progress for the period ending 16 Jun-15 Sep 66.
Brown and Root, Inc., Houston, Tex.
1966, 10p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Data processing systems, Reports), (*Instrumentation, Measurement), Cables (Mechanical), Programming (Computers), Design, Strain gages, Instrumentation, Strain (Mechanics), Pumps, Electric motors.
Identifiers: Mohole project.

Contents: Automated data acquisition and computation systems; Down-hole logging-cable-tension measuring instrument; Logging winches; Orthogonal rock strain. (Author)
PB-175 390 HC$3.00 MF$0.65

PRELIMINARY STUDY FOR AUTOMATED DATA ACQUISITION COMPUTATION SYSTEM.
Project MOHOLE scientific and technical progress rept. for 16 Jun-15 Sep 66.
Brown and Root, Inc., Houston, Tex.
18 Aug 66, 37p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Data processing systems, Feasibility studies), Computers, Computer programs, Automation, Management planning.
Identifiers: Mohole project.

The report is intended to provide executives and management personnel with an appraisal of data processing requirements and to present a considered approach to meet these requirements through an automated processing system.
PB-175 391 HC$3.00 MF$0.65

DOWN-HOLE LOGGING-CABLE-TENSION MEASURING INSTRUMENT.
Project MOHOLE final scientific and technical progress rept. for 16 Jun-15 Sep 66.
Brown and Root, Inc., Houston, Tex.
15 Sep 66, 22p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Instrumentation), Measurement, Design, Cables (Mechanical), Strain (Mechanics), Calibration, Machine tools, Pressure, Tests.
Identifiers: Mohole project.

The extensive logging and borehole measurements program required for Project Mohole dictated the need for a down-hole logging-cable-tension measuring device. A design and development program was initiated and resulted in Subcontract No. 64-64. A basic design providing the required operational compatibility was conceived, and the tentative system was breadboarded into a field prototype tool for tests. The first field test indicated problems still existed in the basic design, and the tool was further laboratory tested. The Mohole Project was terminated and with it the development program for this instrument. As a result, the laboratory tests were incomplete. (Author)
PB-175 392 HC$3.00 MF$0.65

HIGHLIGHTS OF REPORT.
Project MOHOLE scientific and technical progress for the period 16 Jun-15 Sep 66,
Brown and Root, Inc., Houston, Tex.
G. Griswold. 1966, 21p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Deformation, Rock (Geology), Measurement, Sensors, Design, Saws, Fluids, Pressure, Sampling, Detectors, Machine tools, Diamonds, Stresses.
Identifiers: Mohole project.

Rock stress can be measured in situ by means of cutting two diametrically opposite slots into the walls of the borehole. When the slots are cut, the stress envelope surrounding the hole is modified; this modification is detectable by measuring the change in the diameter of the hole along an axis normal to that of the slots. The slot cutting causes a deformation equal to about one-third that created by total stress relief. The amount of deformation is dependent on both the geometry and depth of the slots. Two diamond saw blades of conventional design are so arranged that they can be rotated and swung into position remotely by signals sent from the surface. The body of the tool is anchored in the hole and the expanded cutting blades are drawn up the hole while the deformation sensor, being attached to the body, remains in a steady position. The deformation sensed by the detectors could be amplified in the instrument package and sent to the surface for monitoring. In that this technique measures stress in only one direction at a time, it would be necessary to rotate the device and take three measurements at different orientations. The three measurements would form a 'strain rosette' sufficient to calculate the magnitude and orientation of the principal stress in a plane normal to the borehole. (Author)
PB-175 393 HC$3.00 MF$0.65

NAVAL ARCHITECTURE, MARINE ENGINEERING, AND INSTRUMENTATION SECTION.
Project MOHOLE scientific and technical progress for the period 16 Jun-15 Sep 66.
Brown and Root, Inc., Houston, Tex.
1966, 52p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Ships, Hydrodynamics, Structural properties, Design, Analysis, Drilling, Drilling machines, Floats, Marine engineering.
Identifiers: Mohole project, Drilling vessels.

Contents: Hydrodynamics; Structural analysis methods; Structural design; Drilling operations - Uvalde experimental drilling.
PB-175 394 HC$3.00 MF$0.65

PROJECT MOHOLE PERFORMANCE TESTS: WAKE SURVEYS AND FLOW STUDIES; MAIN PROPULSION PROPELLER OPEN WATER TESTS.
Final rept.,
Michigan Univ., Ann Arbor. Dept. of Naval Architecture and Marine Engineering.
J. C. Gebhardt, and F. C. Michelsen. Jul 66, 78p
Contract NSF-C-260
Prepared on subcontract to Brown and Root, Inc., Houston, Tex.

Descriptors: (*Well logging, Feasibility studies), (*Ship hulls, Model tests), (*Propellers (Marine), Tests), Wake, Performance (Engineering), Marine propulsion, Hydrodynamics, Fluid dynamic properties.
Identifiers: Mohole project.

Various performance tests were carried out on a scale model (scale ratio, 27.5) of one hull of the Mohole Drilling Platform. The results are presented of comprehensive open water tests of the main propulsion propellers for the Mohole vehicle.
PB-175 395 HC$3.00 MF$0.65

DRILLING SECTION.
Project MOHOLE scientific and technical progress rept. for 16 Jun-15 Sep 66.
Brown and Root, Inc., Houston, Tex.
15 Sep 66, 35p
Contract NSF-C-260
See also PB-175 360.

Descriptors: (*Well logging, Feasibility studies), (*Pipes, Geophysical prospecting), Stresses, Bending, Drilling, Control systems, Installation, Pneumatic systems.
Identifiers: Mohole project.

A study was made of possible ways of alleviating high bending stresses in the top portion of the riser during installation. A riser tensioning system was designed to produce and absorb up to around 1,400 HP over a distance of 51 feet in a generally reciprocal harmonic motion. Hydraulic (pneumatic) cylinders working with gas filled accumulators and over limited distance, were chosen as the simplest, most rugged and reliable transducers.
PB-175 396 HC$3.00 MF$0.65

RISER TENSIONING SYSTEM.
Project MOHOLE scientific and technical progress rept. for 16 Jun-15 Sep 66.
Brown and Root, Inc., Houston, Tex.
15 Sep 66, 57p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, *Pipes), Costs, Stresses, Design, Ocean bottom, Environmental tests, Weight, Performance (Engineering), Cutting fluids, Joints, Deflection.
Identifiers: Mohole project.

The ultimate goal of Project Mohole, Phase II, is the drilling of a hole approximately 35,000 feet in depth from the ocean surface at a location where the water depth will be 14,000 to 15,000 feet. The hole will be drilled from a dynamically positioned floating platform. A riser pipe will be provided from an anchored base at the ocean floor to the floating platform to guide drill pipe, bits, and other associated drilling equipment, in and out of the hole and to provide a closed circulating system for drilling fluids. Ocean currents and limited drift of the drilling platform will tend to deflect or displace the riser from the vertical axis through the drilled hole. Response of the drilling platform to environmental forces will result in a constantly changing distance from the platform to the ocean floor and consequently a constantly changing length of the riser. Such deflections and length changes must be controlled to avoid impeding the action of the drill pipe within the riser and to control riser and drill pipe stresses. A Riser Tensioning System between the platform and the lower section of the riser telescoping joint is utilized to support a portion of the riser weight, approximately 100,000 pounds, and to apply a tensioning force, approximately 100,000 pounds, to correct adverse riser curvature. (Author)
PB-175 397 HC$3.00 MF$0.65

OPERATIONAL DRILLING MEASUREMENTS AND DISPLAYS.
Project MOHOLE scientific and technical progress rept. for 16 Jun-15 Sep 66.
Brown and Root, Inc., Houston, Tex.
15 Sep 66, 101p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), (*Drilling, Measurement), (*Display systems, Drilling), Geophysical prospecting, Recording systems, Instrumentation.
Identifiers: Mohole project.

A study was made to identify, define and locate measurements and displays necessary to efficiently drill the Mohole.
PB-175 398 HC$3.00 MF$0.65

OPERATIONS AND LOGISTICS.
Project MOHOLE scientific and technical progress rept. for 16 Jun-15 Sep 66.
Brown and Root, Inc., Houston, Tex.
15 Sep 66, 128p
Contract NSF-C-260

Descriptors: (*Well logging, Feasibility studies), Management planning, Operation, Costs, Drilling, Scheduling.
Identifiers: Mohole project.

Contents: Operational plan; Logistic support; Cost analysis.
PB-175 399 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, *Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole Novem-

ber 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price.
PB-175 400 HC$450.00 MF$150.00

CRATER, EJECTA, AND AIRBLAST STUDIES FROM FIVE HIGH-EXPLOSIVE CHARGES IN A HORIZONTAL SQUARE ARRAY,
Sandia Corp., Albuquerque, N. Mex.
For primary bibliographic entry see Field 18C.
For abstract, see NSA 21 16.
SC-RR-66-480 HC$3.00 MF$0.65

STUDY OF THE MECHANICS OF SLIDE DAMS WITH SAND MODELS,
Michigan Technological Univ., Houghton. Dept. of Civil Engineering.
For primary bibliographic entry see Field 13B.
For abstract, see NSA 21 16.
SC-RR-67-24 HC$3.00 MF$0.65

NUCLEAR EXPLOSIONS IN MISSISSIPPI PROJECTS SALMON AND STERLING,
California Univ., Livermore. Lawrence Radiation Lab.
For primary bibliographic entry see Field 18C.
For abstract, see NSA 21 16.
UCRL-70470 HC$3.00 MF$0.65

8H. Hydrology and Limnology

COLLECTED REPRINTS, 1958-1961: VOLUME V,
Johns Hopkins Univ Baltimore Md Chesapeake Bay Inst
For primary bibliographic entry see Field 8C.
AD-657 102 Not available from CFSTI.

COLLECTED REPRINTS: VOLUME 6,
Johns Hopkins Univ Baltimore Md Chesapeake Bay Inst
For primary bibliographic entry see Field 8C.
AD-657 103 Not available from CFSTI.

PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, 1965. VOLUME II.
Washington Univ Seattle Dept of Oceanography
For primary bibliographic entry see Field 8A.
AD-657 130 HC$3.00 MF$0.65

8I. Mining Engineering

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

8J. Physical Oceanography

COLLECTED REPORTS OF THE 1966 STUDENT TRAINEES OF THE RESEARCH AND DEVELOPMENT DEPARTMENT.
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 8A.
AD-656 915 HC$3.00 MF$0.65

STUDIES IN MARINE GEOPHYSICS AND UNDERWATER SOUND FROM A DRIFTING ICE STATION.
Columbia Univ New York
For primary bibliographic entry see Field 8G.
AD-656 922 HC$3.00 MF$0.65

SEASONAL MEASUREMENT OF OCEANOGRAPHIC PARAMETERS IN THE KAULAKAHI CHANNEL, HAWAII,
Hawaii Inst of Geophysics Honolulu
For primary bibliographic entry see Field 8C.
AD-657 119 HC$3.00 MF$0.65

PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, 1965. VOLUME II.
Washington Univ Seattle Dept of Oceanography
For primary bibliographic entry see Field 8A.
AD-657 130 HC$3.00 MF$0.65

THE OCEAN SCIENCE PROGRAM OF THE U. S. NAVY: ACCOMPLISHMENTS AND PROSPECTS.
Office of the Oceanographer of the Navy Alexandria Va
For primary bibliographic entry see Field 8A.
AD-657 389 HC$3.00 MF$0.65

PARTICULATE ORGANIC CARBON IN THE DEEP SEA.
Woods Hole Oceanographic Institution Mass
For primary bibliographic entry see Field 8D.
AD-657 411 Not available from CFSTI.

ST. PETER AND ST. PAUL ROCKS: A HIGH-TEMPERATURE, MANTLE-DERIVED INTRUSION.
Technical rept.,
Woods Hole Oceanographic Institution Mass
William G. Melson, Eugene Jarosewich, Vaughan T. Bowen, and Geoffrey Thompson. Aug 67, 8p Rept no. WHOI-Ref-67-45, WHOI-Contrib-1896
Contract N00014-66-C-0241
Prepared in cooperation with U. S. National Museum, Washington, D. C.
Availability: Published in Science v155 n3769 p1532-5 1966.

Descriptors: (*Atlantic Ocean Islands, *Petrology), Geochemistry, Northern hemisphere, Metamorphic rock, Spinels.
Identifiers: St. Paul's Rocks.

St. Paul's Rocks, often postulated to be an exposure of the suboceanic mantel, consists of a wider variety of rocks than previously recognized. These perhaps crystallized at different mantle levels, and were subsequently incorporated and mylonitized in a hot but solid intrusion. (Author)
AD-657 419 Not available from CFSTI.

METAMORPHISM IN THE MID-ATLANTIC RIDGE, 22 DEGREES N LATITUDE.
Technical rept.,
Woods Hole Oceanographic Institution Mass
William G. Melson, and Tjeerd H. Van Andel. Jul 67, 24p Rept no. WHOI-Ref-67-31, WHOI-Contrib-1801
Contract N00014-66-C-0241
Prepared in cooperation with National Museum, Washington, D. C., and Scripps Institution of Oceanography, La Jolla, Calif.
Availability: Published in Marine Geology v4 p165-86 1966.

Descriptors: (*Ocean bottom sampling, Atlantic Ocean), (*Rock (Geology), Ocean bottom), Northern hemisphere, Basalt, Metamorphic rock, Geochemistry, Structural geology, Marine geology.
Identifiers: Mid-Atlantic Ridge.

Greenstones derived from basalts, tuffs, and dolerites were dredged at two stations on the eastern slope of the median valley of the Mid-Atlantic Ridge at 22 deg N latitude. The rocks consist mainly of the typical greenschist assemblage albite, actinolite, chlorite, and epidote. The greenstones reflect increasing metamorphic grade and intensity of shearing with the depth at which they were recovered. Bulk chemical analyses of six greenstones give spilitic compositions characterized by high soda (maximum 5.4%) and low potash (minimum 0.05%) contents. Relics of calcic plagioclase, pseudomorphed olivine phenocrysts, and other textural features indicate derivation from abyssal basalts, which typically have soda around 2.7% and potash around 0.2%. The alkali contents of the greenstones are most likely a result of metasomatism during metamorphism, and do not indicate a primary spilitic magma, or reaction between magma and sea water. The significance of the greenstones in relation to the tectonics and structure of the Mid-Atlantic Ridge is discussed. (Author)
AD-657 420 Not available from CFSTI.

DELINEATION OF SEA FLOOR ROUGHNESS IN THE WESTERN NORTH ATLANTIC.
Technical rept.,
Lamont Geological Observatory Palisades N Y
R. G. Markl, J. I. Ewing, and G. M. Bryan. Jul 67, 22p Rept no. TR-2
Contract N00024-67-C-1186

Descriptors: (*Ocean bottom topography, Atlantic Ocean), Reflection, Seismic waves, Oceanographic equipment, Maps, Underwater sound, Sedimentation, Terrain.

The range of roughness of the western North Atlantic sea floor has been assessed and subdivided, largely on the basis of 12 kc echo sounder and seismic profiler data, into three major categories. Charts delineating the areal extent of these three degrees of roughness have been made. (Author)
AD-657 444 HC$3.00 MF$0.65

TEMPERATURE STRUCTURE IN THE UPPER 240 METERS OF THE SEA.
Navy Electronics Lab San Diego Calif
E. C. LaFond, and K. G. LaFond. 1967, 24p
Availability: Published in Marine Technology Society, The New Thrust Seaward; Transactions of the Annual MTS Conference and Exhibit (3rd), Jun 1967, San Diego, California.

Descriptors: (*Oceanographic data, Temperature), Pacific Ocean, Sea water, Thermoclines, Measurement, Oscillation.
Identifiers: Thermistor chain.

Thermal structure in the ocean is related to water masses and geographical location. The most irregular structures are found at oceanographic fronts and in major current systems. In 1966 the temperature structure of the upper 240 meters of the ocean from California to Japan was studied by means of towed sensors. Thermal structure was categorized by the wavelength of the oscillations in the isotherms as well as by the median slope of the isotherms. The amplitudes of the vertical oscillations were inversely proportional to the vertical density gradient of the water. At a towing speed of 6 knots, the frequency, expressed as the power spectrum, usually contained small peaks in the bandwidth around 0.15 and 0.30 cycle per minute (or a wavelength of about 0.66 and 0.33 mile). Other frequencies corresponded to tidal phenomena. The

direction of propagation of the oscillations, evidenced by a Doppler shift in frequency, was established by towing in multidirectional patterns. The direction of propagation was also reflected in the autocorrelation of isotherm depths. From directionality, it appeared that the oscillating thermoclines were composed of numerous internal waves each propagating in a different direction. (Author)
AD-657 512 Not available from CFSTI.

A UNIQUE TOOL FOR UNDERSEA THERMOMETRY, THE THERMISTOR CHAIN,
Navy Electronics Lab San Diego Calif
Julian B. Grafa. 1967, 5p Rept no. Reprint-R-199
Availability: Published in UnderSea Technology 5p May 1967.

Descriptors: (*Oceanographic equipment, *Thermistors), Measurement, Towed bodies, Chains, Temperature, Analog systems, Recording systems, Sea water.
Identifiers: Thermistor chain.

The system consists of 34 tiny plastic-encapsulated thermistors 25 feet apart on a 830-foot chain. The electrical resistivity of each temperature element varies directly with ambient temperature, and these changes are transmitted by conductors which fit through grooves inside the chain. Total system weight including the hoist, drum and chain links is 37,500 pounds. A 2,300-pound streamlined weighted 'fish' is attached to the end of the chain. Data is processed electronically and presented in analog form (as isotherms) on a 19-inch-wide paper chart. Although the sensors measure temperatures to the nearest 0.1C, the recorder is adjusted to plot isotherms at one degree intervals.
AD-657 513 Not available from CFSTI.

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

8K. Seismology

POST-DOCTORAL PROGRAM IN SEISMOLOGY.
Annual rept. 1 Jul 66-30 Jun 67,
Massachusetts Inst of Tech Cambridge Dept of Geology and Geophysics
Frank Press, and N. Nafi Toksoz. 30 Jun 67, 28p
Contract AF 49 (638)-1763, ARPA Order-292-66

Descriptors: (*Seismology, Reports), Surface properties, Anisotropy, Seismological stations, Oscillation, Rotation, Antenna arrays, Networks, Seismic waves, Filters (Electromagnetic wave).

Contents: Synthesis of dilatation and rotation seismograms; Particle motion - mode filters; Structures of the earth's core; Partial derivatives of the phase velocity of surface waves with respect to anisotropy factors; Application of array data processing techniques to a network of seismograph stations; Excitation of free oscillations and surface waves by a point source in a vertically heterogeneous earth.
AD-657 087 HC$3.00 MF$0.65

OPERATION OF A LONG PERIOD SEISMOGRAPH NETWORK UTILIZING MAGNETIC TAPE RECORDING AND ANALYSIS OF DATA RECORDED ON MAGNETIC TAPE.
Final rept. Jun 65-May 67,
Lamont Geological Observatory Palisades N Y
Paul W. Pomeroy. 1 Jul 67, 23p
AFCRL-67-0449
Contract AF 19 (628)-5058, ARPA Order-292

Descriptors: (*Seismographs, *Networks), Magnetic tape, Recording systems, Surface properties, Earthquakes, Nuclear explosions, Seismological stations, Monitors, Data.

The worldwide network of long-period seismographs recording on magnetic tape established under the sponsorship of AF19 (604)-8485 has been operated continuously under the present contract. The stations at Mt. Tsukuba, Japan; Honolulu, Hawaii; Uppsala, Sweden; Huancayo, Peru; College, Alaska; Canberra, Australia; and Palisades, New York, have produced large amounts of valuable data. Many studies utilizing this data have been carried out and several of these are of particular significance to the VELA-UNIFORM program. These include: the relative excitation of surface and body waves by the underground nuclear explosion Long Shot, the magnitude and AR measurements from nuclear explosions and earthquakes in the Western United States, the determination of energy radiation patterns for GNOME, HARDHAT, and the New Madrid and Hebgen Lake earthquakes, the amplitude frequency content and travel times of PcP from nuclear explosions and earthquakes. These studies together with many others utilized the data from this network and indicate the value of this type of recording. (Author)
AD-657 320 HC$3.00 MF$0.65

GEOPHYSICAL STUDY OF BASIN-RANGE STRUCTURE DIXIE-VALLEY REGION, NEVADA.
Stanford Univ Calif Dept of Geophysics
For primary bibliographic entry see Field 8G.
AD-657 326 HC$3.00 MF$0.65

SEISMIC DISCRIMINATION.
Semiannual technical summary rept. 1 Jan-30 Jun 67,
Massachusetts Inst of Tech Lexington Lincoln Lab
Paul E. Green. 30 Jun 67, 42p
ESD-TR-67-325
Contract AF 19 (628)-5167, ARPA Order-512
See also AD-646 677.

Descriptors: (*Seismology, *Networks), (*Detection, *Seismic waves), Signal-to-noise ratio, Antenna arrays, Earthquakes, Nuclear explosions, Underground, Seismometers, Site selection.
Identifiers: LASA.

In continuation of work on networks embodying both large and small arrays, plans have been prepared for a second Large Aperture Seismic Array (LASA) station. Studies of on-line detection and location and also signal-to-noise improvement using large array structures are continuing. Significant progress in the discrimination area using relative excitation of body and surface waves is reported. (Author)
AD-657 327 HC$3.00 MF$0.65

LARGE APERTURE SEISMIC ARRAYS.
Final rept.
General Atronics Corp Philadelphia Pa
Jun 67, 209p
ESD-TR-67-453
Contract AF 19 (628)-5981, ARPA Order-800

Descriptors: (*Seismology, *Antenna arrays), Signals, Processing, Antenna apertures, Seismic waves, Propagation, Epicenter, Seismometers, Earthquakes, Seismographs, Tables, Discriminators, Errors, Pulse height analyzers, Signal-to-noise ratio.
Identifiers: LASA.

Theoretical derivations and calculated array patterns are presented for the following seismic arrays: the existing LASA-Montana, a random array with an aperture comparable to LASA-Montana (200 km), and continental-size array with an aperture of several thousand kilometers. The use of LASA-Montana for determining epicenters of seismic events is discussed and results are presented that indicate errors on the order of 60 kilometers. Data on the correlation across LASA of various portions of seismograms are presented, and the implications for array processing gains are briefly discussed. Two tests for identifying earthquakes with depths between 10 and 40 km are introduced, and experiments on approximately 40 seismic events, on which both tests performed quite well, are summarized. The possibility of using DIMUS processing on a seismic array is discussed. Calculations are presented based on the conventional DIMUS processing as well as on a modified DIMUS scheme that appears to be significantly better. Calculations based on several seismic events show a significant amount of 'signal' energy in the spectral region of 4 Hz in most of the records resulting from surface-focus events. Calculations based on records from deep Fiji Island earthquakes suggest an upper mantle Q of less than 500 for that region. (Author)
AD-657 349 HC$3.00 MF$0.65

THE CRUST AND THE UPPER MANTLE OF THE CONTINENTS.
Academy of Sciences (USSR), Moscow. Soviet Geophysical Committee.
For primary bibliographic entry see Field 8G.
For abstract, see STAR 05 19.
N67-33683 HC$3.00 MF$0.65

METAMORPHISM AND DEEP STRUCTURE OF THE NORITE- DIORITE (GRANULTIC) SERIES OF RUSSIAN LAPLAND.
Academy of Sciences (USSR), Moscow. Soviet Geophysical Committee.
For primary bibliographic entry see Field 8G.
For abstract, see STAR 05 19.
N67-33684 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

THEORETICAL AMPLITUDES AND TRAVEL TIMES OF EXPLOSION-GENERATED SEISMIC P WAVES,
California Univ., Livermore. Lawrence Radiation Lab.

For primary bibliographic entry see Field 18C.
For abstract, see NSA 21 16.
UCRL-50232 HC$3.00 MF$0.65

8L. Snow, Ice, and Permafrost

SURVEY OF FROZEN PRECIPITATION IN URBAN AREAS AS RELATED TO CLIMATIC CONDITIONS.
Technical rept.,
Cold Regions Research and Engineering Lab Hanover N H
Michael A. Bilello. May 67, 37p Rept no. CRREL-TR-162

Descriptors: (*Snow, Climatology), (*Urban areas, Climatology), Atmospheric precipitation, Meteorological parameters, Statistical analysis, Periodic variations, United States.

The study investigates relationships between observed frozen precipitation and associated meteorological conditions in large cities, and develops procedures for presenting tabulated data on frozen precipitation in a readable and usable form. An explanation of several interpretations is included with methods of analysis, sample diagrams, advantages and disadvantages, and comparisons of the different interpretations. To avoid excessive bulk, only the diagrams for LaGuardia Airport and Buffalo, New York, are discussed in this paper. Similar Figures for 22 other stations are on file at USA CRREL. (Author)
AD-657 212 HC$3.00 MF$0.65

UNDERSTANDING THE VARIATIONS OF THE PHYSICAL PROPERTIES OF SEA ICE.
Special rept.,
Cold Regions Research and Engineering Lab Hanover N H
W. F. Weeks. May 67, 21p Rept no. CRREL-SR-112

Descriptors: (*Ice, Physical properties), (*Oceans, Periodic variations), Dielectric properties, Crystal structure, Mechanical properties, Crystal growth, Mathematical analysis, Salinity, Photographic analysis, Low-temperature research.

Information and test results are presented concerning the mechanism of growth, brine content, strength, structure, and dielectric properties of sea ice. Suggestions are given for improving methods of calculating growth conditions and a schematic drawing is given of the solid-liquid interface for sea ice together with photomicrographs of sea ice at low temperatures. (Author)
AD-657 213 HC$3.00 MF$0.65

THE OCEAN SCIENCE PROGRAM OF THE U. S. NAVY: ACCOMPLISHMENTS AND PROSPECTS.
Office of the Oceanographer of the Navy Alexandria Va
For primary bibliographic entry see Field 8A.
AD-657 389 HC$3.00 MF$0.65

ECHINODERMS COLLECTED FROM A DRIFTING ICE ISLAND OFF THE EAST GREENLAND COAST, WITH COMMENTS ON THEIR DISTRIBUTION IN ADJACENT WATERS,
University of Southern California Los Angeles Dept of Biological Sciences
For primary bibliographic entry see Field 6C.
AD-657 487 Not available from CFSTI.

PRINCIPLES OF GEOCRYOLOGY (PERMAFROST STUDIES). PART II. ENGINEERING GEOCRYOLOGY. CHAPTER XIII. NEW AND IMMEDIATE PROBLEMS IN ENGINEERING GEOCRYOLOGY.
National Research Council of Canada, Ottawa (Ontario).
For primary bibliographic entry see Field 13B.
For abstract, see STAR 05 19.
N67-33281 HC$3.00 MF$0.65

8M. Soil Mechanics

CLAY MOBILITY, PORTUGUESE BEND, CALIFORNIA,
Columbia Univ New York Dept of Geology
Paul F. Kerr, and Isabella M. Drew. Apr 67, 32p Rept no. Scientific-1
AFCRL-67-0234
Contract AF 19 (628)-5550

Descriptors: (*Clay, Mobility), (*Avalanches, California), Clay minerals, Montmorillonite, Particle size, Measurement, Physical properties, Viscosity, Water, Stability, Aerial photographs, Shale, Erosion.

The south slope of Palos Verdes Hills west of San Pedro, California, in the area known as Portuguese Bend contains an unusual landslide. The slide movement takes place in members of the Monterey Shale which contain bentonite; particularly the Portuguese Tuff. Samples of bentonite from the tuffaceous rocks are rich in Ca-montmorillonite which has definite thixotropic properties. When dry the clay is stable, but with the adsorption of water it swells and may ultimately flow. Overlying shale masses although substantial in themselves are slowly rafted down sloped on the underlying bentonite-lubricated slip plane. Movements have frequently been measured in terms of a small fraction of an inch per day, but during a year cumulative movement in places may amount to 10 to 30 feet. The physical properties of the clay have been studied in considerable detail and reveal a mobile material. Field observations indicate that enlargement of the slide area is also in constant progress. No field control of this situation has yet been established. (Author)
AD-657 086 HC$3.00 MF$0.65

APPLICATIONS OF THE SOLID AND LIQUID STATE CONCEPTS FOR MACROMERITIC LIQUIDS.
Bell Helicopter Co Fort Worth Tex Electronics Dept
For primary bibliographic entry see Field 13B.
AD-657 335 HC$3.00 MF$0.65

THE EFFECT OF AN ELASTIC MEMBRANE ON THE STABILITY OF A TRIAXIAL TEST OF A TIME INDEPENDENT SOIL,
Brown Univ Providence R I Div of Engineering
Jay B. Weidler, and Paul R. Paslay. Jul 67, 17p Rept no. ARPA-E47
Contract SD-86

Descriptors: (*Soil mechanics, Membranes), Theory, Elasticity, Tests, Time, Shear stresses, Deformation, Mathematical models.

Using an analytical model to represent the soil and an elastic-membrane theory to represent the sheath commonly used around the soil sample the stability of the soil-membrane system is studied. The measure of stability used is the time derivative of the rate of doing work by the external loading for a prescribed motion. The results give a means of evaluating the relative effect of the membrane on the initial stability of the system. A numerical example shows the effect to be negligible in the case of the initial stability of a particular soil. (Author)
AD-657 344 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

8N. Terrestrial Magnetism

ON THE INTRODUCTION OF THE TERRAIN CORRECTION IN GRAVIMETER OBSERVATIONS.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
V. B. Naugolnikov. Jul 67, 11p
ACIC-TC-1219, TT-67-62629
O vvedenii Popravki za Relef Mestnosti v Gravimetrovye Nabludeniya, trans. of Razvedochnaya Geofizika (USSR), n8 p99-103 1965.

Descriptors: (*Terrestrial magnetism, Special functions (Mathematical)), Terrain, Density, Gravity, USSR.

In geophysical literature, many works are dedicated to the calculation of the influence of the terrain relief upon the data of gravimetric measurements. At present, generally accepted methods of calculation consist of the computation and introduction of the so called correction for the terrain relief. This is an addition to the correction for the intermediate layer. Such problems as the connection between the topographic corrections and the reduction, the selection of an appropriate density value and methods for the introduction of the correction to gravimetric observations, require further studies. The connection of the topographic correction with the correction for the intermediate layer, as well as the selection of the density value for the computation of the correction for the relief, depending on the density value of the intermediate layer, are examined in this article. (Author)
AD-656 990 HC$3.00 MF$0.65

DATA OF GRAVIMETRIC SURVEYS AND PROBLEMS OF DIRECT SEARCH FOR OIL AND GAS ON THE MONZHUKLY STRUCTURE,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
B. I. Kireev. Jul 67, 1p
ACIC-TC-1217, TT-67-62630
Resultaty Gravimetricheskikh Issledovanii s Zadachei Pryamykh Poiskov nefti i gaza na Structure Monzhukly, trans. of Razvedochnaya Geofizika (USSR), n8 p104-8 1965.

Descriptors: (*Terrestrial magnetism, Gravity), Folds (Geology), Deposits, Petroleum, Natural resources, Measurement, USSR.

Gravimetric measurements along three profiles were taken on the Monzhukly structure. A weak gravity minimum was noted in the crest part of the Monzhukly fold. I. G. Modoviskiy hypothetically explained its nature by the presence of screened gas and oil deposits in the northern part of the block of the fold. A detailed gravimetric survey was conducted for the determination of this minimum. This detailed survey made it possible to outline more precisely the general relative gravity maximum, corresponding to the structure, and to separate against its background a relative gravitational minimum. A comparison between the data of the gravimetric survey and the geological map

distinctly shows the confinement of the minimum to the northern block of the fold. In the Monzhukly region, the given minimum could be caused by the influence of the terrain relief not being sufficiently taken into account, by errors in the determination of the Bouguer correction, by the presence of oil and gas deposits in the interior part of the fold, by the lithologic-structural characteristic of the fold. The paper discusses the above possibilities and explanations, with the conclusions drawn from the gravimetric and geologic studies. (Author)
AD-656 991 HC$3.00 MF$0.65

STRUCTURE OF THE CRYSTALLINE BASE OF THE SOUTHEASTERN PART OF THE RUSSIAN PLATFORM AND ITS FRAMING, ACCORDING TO DATA OF AEROMAGNETIC SURVEY (DELTA T).
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
D. P. Kasatkin. Jun 67, 11p
ACIC-TC-1236, TT-67-62633
Struktura Kristallicheskogo Fundamenta Yugo-Vostochnoi Chasti Russkoi Platformy i ee Obramleniya po Dannym Aeromagnitnoi Syemki (Delta T), trans. of Neftegazovaya Geologiya i Geofizika (USSR), n4 p34-7 1966.

Descriptors: (*Terrestrial magnetism, USSR), Folds (Geology), Geology, Faults (Geology).

The paper presents the differences in formations of the Russian platform consisting of the Southern and Eastern framing regions together with the Southeastern region. This platform has been divided into five zones, and each zone is described in this translation. (Author)
AD-656 993 HC$3.00 MF$0.65

INTERPRETATION OF THE MAGNETIC AND GRAVITATIONAL ANOMALIES ABOVE STRATFIED BODIES.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 8G.
AD-656 995 HC$3.00 MF$0.65

SOME RESULTS OF A STUDY OF THE DEEP-SEATED STRUCTURE OF THE EARTH'S CRUST IN THE BLACK SEA DEPRESSION AND ADJACENT AREAS.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
V. E. Burakovskii. Aug 67, 11p
ACIC-TC-1224, TT-67-62624
Nekotorye Rezultaty Izucheniya Glubinnogo Stroieniya Zemnoi Kory Chernomorskoi Vpadiny i Prilegayushchikh Territorii, trans. of mono. Stroenie Chernomorskov Vpadiny. Sbornik Statei, Moscow, 1966 p22-6.

Descriptors: (*Terrestrial magnetism, Black Sea), Hydrology, Terrain, Gravity, USSR.

Some results of an analysis of the gravitational field of the Black Sea depression and of the adjoining territory along deep seismic sounding (DSS) profiles are presented. The gravity effect created by all the division surfaces of the earth's crust located by DSS is calculated. The fact is established of a discrepancy in the gravitational field and the behavior of the deep crust division surfaces in the western part of the water area. This established discrepancy is put forward as a proof of the different structure of the earth's crust in the western and eastern parts of the Black Sea water area. (Author)
AD-656 996 HC$3.00 MF$0.65

ON THE THEORY OF TEMPORAL PERTURBATIONS OF THE GRAVITATIONAL AND MAGNETIC FIELDS IN CONNECTION WITH RECENT TECTONOPHYSICAL PROCESSES IN THE EARTH.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
E. E. Fotyadi, G. I. Karatayev, and B. I. Shcheglov. Aug 67, 10p
ACIC-TC-1248, TT-67-62626
K Teorii Vremennykh Vozmushchenii Gravitatsionnogo i Magnitnogo Polei v Svyazi s Sovremennymi Tektono-Fizicheskimi Protsessami v Zemle, trans. of Akademiya Nauk SSSR. Doklady, v171 n3 p590-2 1966.

Descriptors: (*Terrestrial magnetism, *Gravity), Geophysics, Magnetometers, Astronomical observatories, Density, Measurement, Periodic variations, USSR.

The translation of papers gives some results of investigations pertaining to the connection between temporal gravitational and magnetic potentials and the form, density and magnetization of the perturbing bodies that change in terms of time. Observations, usually over a 2-3 year period, are conducted at the same point. At some stations continuous daily observations are made for the changes in terms of time of the gravitational and magnetic fields and inclinations of the earth's surface. At present, these observations are made in a number of regions of the USSR, including Siberia, where networks of stationary geophysical polygons have been developed. Magnetometers, gravimeters and tiltmeters are useful in this continuous observation. (Author)
AD-656 998 HC$3.00 MF$0.65

SHORT-PERIOD OSCILLATIONS IN THE EARTH'S ELECTROMAGNETIC FIELD.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 4A.
AD-657 164 HC$3.00 MF$0.65

GEOPHYSICAL STUDY OF BASIN-RANGE STRUCTURE DIXIE-VALLEY REGION, NEVADA.
Stanford Univ Calif Dept of Geophysics
For primary bibliographic entry see Field 8G.
AD-657 326 HC$3.00 MF$0.65

PROGRAM SOLUTIONS TO SPACE SCIENCE PROBLEMS,
International Business Machines Corp Cambridge Mass Cambridge Advanced Space Systems Dept
For primary bibliographic entry see Field 9B.
AD-657 333 HC$3.00 MF$0.65

U. S. NAVAL OCEANOGRAPHIC OFFICE GEOMAGNETIC SURVEYS.
Informal rept.
Naval Oceanographic Office Washington D C
Jul 67, 83p Rept no. NOO-IR-67-52

Descriptors: (*Terrestrial magnetism, Surveying), Airborne, Shipborne, Maps, Naval research.
Identifiers: Magnet project.

Since 1953, the U. S. Naval Oceanographic Office has conducted geomagnetic surveys over various ocean areas of the world. Information on survey locations, dates, navigational control, track patterns, data format, and availability of geomagnetic technical reports, charts, and other publications is presented. (Author)
AD-657 346 HC$3.00 MF$0.65

RELATIONSHIP BETWEEN CHANGES IN THE INTERPLANETARY MAGNETIC FIELD AND VARIATIONS IN THE MAGNETIC FIELD AT THE EARTH'S SURFACE.
Royal Inst. of Tech., Stockholm (Sweden). Div. of Plasma Physics.
C.-G. Faelthammar, and G. Rostoker. 26 May 67, 27p REPT.-67-10

Descriptors: *Earth surface, *Geomagnetism, *Interplanetary magnetic field, *Magnetic field disturbance, Azimuth, Disturbance, Earth, Electric, Field, Imp, Impulse, Interplanetary, Magnetic, Magnetometer, Solar, Storm, Surface, Wind.

For abstract, see STAR 05 19.
N67-33448 HC$3.00 MF$0.65

MAGNETIC STORM EFFECTS ASSOCIATED WITH THE TAIL OF MAGNETOSPHERE.
Cornell Univ., Ithaca, N. Y.
W. I. Axford. May 66, 20p ESRO-SN-24
Presented At the Esro Colloq. on Auroral and Assoc. Magnetospheric Phenomena At Very High Latitudes, Stockholm, 16-18 Nov. 1965

Descriptors: *Energy dissipation, *Magnetic storm, *Magnetosphere, *Solar wind, Belt, Boundary, Dissipation, Effect, Energy, Interaction, Layer, Magnetic, Radiation, Solar, Storm, Tail, Wind.

For abstract, see STAR 05 19.
N67-33532 HC$3.00 MF$0.65

DESIRABLE MAGNETIC FIELD MEASUREMENTS IN THE HIGH-LATITUDE MAGNETOSPHERE.
Royal Inst. of Tech., Stockholm (Sweden).
R. Bostroem. May 66, 17p ESRO-SN-25
Presented At the Esro Colloq. on Auroral and Assoc. Magnetospheric Phenomena At Very High Latitudes, Stockholm, 16-18 Nov. 1965

Descriptors: *Auroral zone, *Magnetic field, *Magnetosphere, Aurora, Conference, Current, Disturbance, Field, High latitude, Magnetic, Measurement, Satellite, System, Zone.

For abstract, see STAR 05 19.
N67-33536 HC$3.00 MF$0.65

GEOMAGNETIC RESEARCHES, NO. 8.
Academy of Sciences (USSR), Moscow. Soviet Geophysical Committee.
1966, 123p
in Russian, English Summaries

Descriptors: *Geomagnetism, *International geophysical year (igy), Activity, Analysis, Disturbance, Diurnal, Field, Harmonic, Latitude, Magnetic, Program, Square, Storm, Time, U.S.S.R., Universal, Variation.

For abstract, see STAR 05 19.
N67-33667 HC$3.00 MF$0.65

THE HELIUM MAGNETOMETER.
Imperial Coll. of Science and Technology, London (England). Dept. of Geology.
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 19.
N67-33896 HC$3.00 MF$0.65

PAYLOAD MISSIONS AND CONSTRUCTION OF THE THIRD RUBIS ROCKET.
Max-planck-institut Fur Physik Und Astrophysik, Munich (West Germany).
For primary bibliographic entry see Field 4A.
For abstract, see STAR 05 19.
N67-33942 HC$3.00 MF$0.65

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

WAVE PROPAGATION ALONG PERIODIC STRUCTURES AND PLASMA SLABS.

Leeds Univ (England) Dept of Electrical and Electronic Engineering
For primary bibliographic entry see Field 20N.
AD-656 787 HC$3.00 MF$0.65

EVAPORATED SILICON THIN-FILM TRANSISTORS.
Revised ed.,
British Columbia Univ Vancouver Dept of Electrical Engineering
C. A. T. Salama, and L. Young. 16 Dec 66, 15p
Revision of manuscript submitted 3 Oct 66.
Availability: Published in Solid-State Electronics v10 p473-84 1967.

Descriptors: (*Field effect transistors, Films), Silicon, Manufacturing methods, Transport properties, Performance (Engineering), Electrical properties, Vapor plating, Carriers (Semiconductors), Mathematical models, Surface properties.

The method of fabrication, the theory and properties of evaporated silicon thin-film transistors are discussed. The device consists of a p-type silicon film (0.5-2 microns thick) on a sapphire substrate, with aluminum source-drain electrodes evaporated onto the silicon and followed by a silicon oxide, SiOx, insulating layer and an aluminum gate. The device operates by field-effect conductivity modulation of an n-type inversion layer at the surface of the p-type film. The silicon thin-film transistors fabricated have typical effective mobilities of 5-10 cm squared/V-sec with transconductances as high as 100 micromho and gain-bandwidth products up to 1 MHz. Surface trapping was found to affect the behavior of the devices at low gate voltages. The characterization of the traps by a method which involves measurements of the source-drain conductance, its temperature dependence and its transient response is discussed. The device characteristics were stable in vacuum but drifted when exposed to the atmosphere. (Author)
AD-656 877 Not available from CFSTI.

JUNCTION FIELD-EFFECT TRANSISTOR CHARACTERISTICS RELEVANT TO ANALOG SWITCH CIRCUITS.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Edgar H. Fischer. Apr 67, 112p Rept no. TG-908
Contract NOw-62-0604

Descriptors: (*Field effect transistors, *Switching circuits), Electrical properties, Analog systems, Performance (Engineering), Theses, Models (Simulations), Analysis.

The junction Field-Effect Transistor (FET) is evaluated for use in analog switch circuits. FET characteristics, such as channel resistance, drain cutoff current, pinch-off voltage and device capacitance, are analyzed for sensitivity to changes in temperature and voltage. Equivalent circuits are provided for an FET used as an analog switch. Separate equivalent circuits are used for transient analysis and steady-state analysis. A series analog switch is analyzed for turn-off transients that occur for various rise-time gate control signals. An effective voltage Ve is introduced to facilitate a two-part transient analysis for an initial and final turn-off transient. Turn-on transients are analyzed qualitatively. A steady-state analysis shows the effect of temperature on the error voltage at the analog switch output. (Author)
AD-656 889 HC$3.00 MF$0.65

SOLID STATE IMAGE INTENSIFIERS.
Monthly technical engineering rept. no. 14, 1 May-31 May 67,
Westinghouse Electric Corp Elmira N Y Electronic Tube Div
T. G. Keeton, M. A. Novice, and Z. Szepesi. 8 un 67, 4p
Contract N61339-66-C-0064
See also AD-648 636.

Descriptors: (*Image intensifiers (Electronics), Manufacturing methods), Photoconductivity, Cadmium selenides, Electroluminescence, Resolution, Performance (Engineering).

Improvements in the picture quality of the output image were achieved by three different methods. Experiments were carried out using various intermediate opaque layers. A new method of building modularized panels was considered and an EL module was fabricated. Demonstration samples of image intensifiers and EL panels have been presented to Mr. J. Victoria, Project Engineer of the NTDC, and sent to Port Washington as required by the contract. (Author)
AD-656 920 HC$3.00 MF$0.65

SOLID STATE IMAGE INTENSIFIERS.
Monthly technical engineering rept. no. 15, 1 Jun-30 Jun 67,
Westinghouse Electric Corp Elmira N Y Electronic Tube Div
T. G. Keeton, M. A. Novice, and Z. Szepesi. 11 Jul 67, 4p
Contract N61339-66-C-0064
See also AD-656 920.

Descriptors: (*Image intensifiers (Electronics), Manufacturing methods), Cadmium selenides, Electroluminescence, Performance (Engineering), Life expectancy, Humidity.

Image intensifier panels have been constructed with acetic acid washed CdSe powders and on etched substrates. The effect of intermediate electrodes was investigated. Half lives of EL layers have been increased by a factor of 3 to 4 due to careful schedule during deposition of the layer. Experiments with different casting resins have been made for the protection of individual modules. (Author)
AD-656 921 HC$3.00 MF$0.65

SOME TOWED LINE HYDROPHONE ARRAYS FOR SEISMIC REFLECTION PROFILING.
Technical rept. nos. 1, 2 and 9,
Lamont Geological Observatory Palisades N Y
C. C. Windisch, and J. I. Ewing. May 67, 29p
Contracts N00024-67-C-1186, Nonr-266 (79)

Descriptors: (*Hydrophones, Towed bodies), Seismic waves, Deep water, Marine geophysics.

The report reviews briefly developments of ship-towed line hydrophone arrays used in deep-ocean geophysical programs. These arrays have been used with explosives and lower energy sound sources to gather seismic reflection data at ship's speed averaging 10-12 knots. (Author)
AD-656 936 HC$3.00 MF$0.65

DEVELOPMENT OF AUDIO TRANSDUCER HELMET ASSEMBLY.
Quarterly rept. no. 1, 2 Jan-31 Mar 67,
CBS Labs Stamford Conn
Allan J. Rosenheck, and Alfred L. DiMattia. Jul 67, 23p
ECOM-0204-1
Contract DAAB07-67-C-0204

Descriptors: (*Earphones, Helmets), Flight crews, Microphones, Ear protectors, Acoustic insulation, Design, Transducers.

Program objective is the development of an Audio Transducer Helmet Assembly to be used in the Army Aircrewman Helmet. The assembly includes earphones mounted in attenuating earcups along with auxiliary hardware, wiring and ancillary devices. A further goal is development of a miniature moving-coil, noise-cancelling microphone having improved noise-cancellation characteristics. A comprehensive review of previous efforts was performed including evaluation of the enclosure presently used on the APH-5 helmet and a survey of several novel ear enclosure concepts under recent Army contracts--low-frequency-coupled volumes, low-profile ear enclosures, gel-filled cushions, mutual-stiffness-coupled and bellows-coupled enclosures. Evaluation and comparison of these and other methods revealed that low-frequency-coupled volumes or low-profile enclosures, in conjunction with gel-filled cushions, are most feasible for this application. Assessment was made of the space available in the present helmet for enclosures with a goal of avoiding an increase in the external ear-to-ear measurement. Various techniques of mounting the enclosures within the helmet were explored and experiments performed toward optimizing the gel-filled cushion design. (Author)
AD-656 938 HC$3.00 MF$0.65

CONTROL OF THE SURFACE POTENTIAL OF EVAPORATED CdS LAYERS,
Simon Fraser Univ Burnaby (British Columbia) Dept of Physics
For primary bibliographic entry see Field 20L.
AD-656 954 Not available from CFSTI.

NEW SOLID-STATE DEVICE CONCEPTS,
General Electric Co Schenectady N Y Research and Development Center
M. Aven, W. Garwacki, R. N. Hall, and J. R. Richardson. Jun 67, Rept no. Scientific-8
AFCRL-67-0427
Contract AF 19 (628)-4976
See also AD-649 334.

Descriptors: (*Semiconductor devices, Solid state physics), Carriers (Semiconductors), Transport properties, Phonons, Scattering, Zinc compounds, Films, Resistance (Electrical), Gallium arsenides, Diodes (Semiconductor), Tellurium, Integrated circuits, Manufacturing methods.

Electrical transport studies in p-type ZnTe have confirmed that in the temperature range of about 80 to 500K the hole mobility is principally limited by LO phonon scattering. An effective mass ratio of 0.6 gives the best fit to the experimental data. The highest mobility, 6500 cm squared/v sec at 35K, was observed in a crystal with an active defect center concentration of 2 x 10 to the 15th power/cc. The ionization energy of the first charge state of a native acceptor, believed to be a Zn vacancy, was found to be = or > 0.057 plus or minus 0.002 ev. Low-resistance electrical contacts to p-type ZnTe and ZnSexTe1-x can be made by diffusing Li from a Li salt into the area of the crystal to be contacted and forming an electroless Au deposit on top of the Li-diffused area. The Li-Au contacts stay nearly ohmic down to 35K and have been used on crystals having carrier concentrations below 10 to the 9th power/cc. Detailed studies of the current voltage relations for thin-film diodes of gallium arsenide have shown that the negative resistance and bistable resistance at zero bias are intimately related to the properties of the tellurium counter-electrode. Optical and electrical measurements on the films of evaporated tellurium have shown these films to be 'p'-type semiconductors with an energy gap of 0.7 to 0.8 volt. Diodes are now being fabricated in a geometry compatible with integrated circuit techniques.
AD-657 023 HC$3.00 MF$0.65

PHOTOCATHODE-FILTER COMBINATION RESPONSE CURVES AND TABLES.
Final rept.,
Aerospace Research Labs Wright-Patterson AFB Ohio
Gary L. Duke. Mar 67, 169p Rept no. ARL-67-0067

Descriptors: (*Photocathodes, Tables), (*Filters (Electromagnetic wave), Photocathodes), Illumination, Sensitivity, Response, Photoelectric effect.

With the increasing use of photocathodes in all fields of basic and applied research there has arisen the need for the ability to make a quick selection of the correct photocathode for a particular situation. In a vast majority of the cases, however, it is not the photocathode alone which must be considered but a combination of photocathode and

filter to be used in connection with a certain illuminating source so that a desired spectral sensitivity is achieved. These curves and tables are intended to make possible a quick selection of the proper combination. Data used in these calculations was taken from standard tables (Kodak Wratten Filters for Scientific and Technical Use and ITT Typical Absolute Spectral Response Characteristics of Photoemissive Devices), so that, although the spectral response and/or transmission of a particular combination may be slightly different because of production variations, aging, etc., these results are sufficiently accurate for most practical work. (Author)
AD-657 026 HC$3.00 MF$0.65

SLIDING ELECTRICAL CONTACT MATERIALS FOR USE IN ULTRAHIGH VACUUM.
Revised ed.,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
Francis J. Clauss, and Marshall K. Kingery. 13 Dec 66, 6p
Contract AF 40 (600)-1070
Prepared for presentation at AIAA Structures and Materials Conf. (6th), Palm Springs, Calif. 5-7 Apr 65.
Availability: Published in Journal of Spacecraft and Rockets v4 n4 p480-5 Apr 1967.

Descriptors: (*Sliding contacts, *Composite materials), Vacuum, Wear resistance, Noise, Silver, Copper, Molybdenum compounds, Sulfides, Resistance (Electrical).

The paper presents information on a new sliding contact material, 85 Ag-2.5 Cu-12.5 MoS2. Experimental studies have demonstrated that it can operate in vacua to 10 to the 9th power torr at current densities up to at least 300 amp/sq. in., sliding velocities up to at least 425 in./min, and brush contact pressures from 6 to 10 psi. Brush wear is on the order of 20 mils/1000 hr of operation under such conditions, contact resistance is less than 0.5 mohms/sq. in., and noise is less than 5 mv. Conventional brush materials under these conditions wear approximately 20 times as fast, cause severe ring wear, and create nearly 100 times as much electrical interference. The new material is stronger, easier to fabricate, and causes negligible ring wear; the noise level when operating at low current densities, as when transmitting data signals, is undetectable. (Author)
AD-657 074 Not available from CFSTI.

LOW FREQUENCY MEASUREMENTS ON SPRAGUE ELECTRIC SPECIAL 30 mfd METALLIZED CAPACITORS,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
R. L. Konigsberg. 18 Oct 56, 53p Rept no. CF-2581
Contract NOrd-7386

Descriptors: (*Paper capacitors, Dielectric properties), Extremely low frequency, Wiring diagrams, Capacitance, Dissipation factor, Test methods, Test equipment, Performance (Engineering).

Bridge measurements were made to determine direct capacitance and dissipation factor variations with frequency, temperature and DC bias voltage for each of 3 special Sprague Type S3631, 30 mfd metallized paper capacitors. The following ranges were covered: Frequency: .05 to 10 cps; Temperature: 90 to 165 degrees F; DC Bias Voltage: 0 to 50 volts. Curves displaying the variations over the above ranges are presented for each test capacitor. A new type operational bridge, unusual in design, was constructed. It yielded good accuracy over the above frequency range, high current sensitivity, and excellent DC balance stability for these very low frequency measurements. (Author)
AD-657 146 HC$3.00 MF$0.65

RADIATION DAMAGE TO ORBITING SOLAR CELLS AND TRANSISTORS.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 10B.
AD-657 155 HC$3.00 MF$0.65

LIFE TESTS OF VACUUM TUBES UNDER SIMULATED CONDITIONS OF SHIPBOARD STORAGE OF GUIDED MISSILES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
S. A. Buckingham. 15 May 57, 93p Rept no. CF-2640
Contract NOrd-7386

Descriptors: (*Vacuum apparatus, Environmental tests), Guided missiles, Storage, Vibration, Shock (Mechanics), Noise, Degradation, Tables.

Nine tubes of each of four subminiature types (Type 5718, Type 5719, Type 5840, and Type 5899) were subjected to shock excitation at a fundamental frequency of 23 cycles per second with an amplitude of 0.11 inches. Various parameters and leakages were measured as well as microphonic noise. There is no evidence that any tube was seriously affected by this treatment and, on the average, the tubes were essentially unchanged by the 22,000 hours of vibration which they experienced. (Author)
AD-657 158 HC$3.00 MF$0.65

APPLIED RESEARCH IN THIN-FILM FIELD-EMISSION TUBES.
Quarterly rept. no. 6, 1 Jan-31 Mar 67,
Stanford Research Inst Menlo Park Calif
C. Hartelius, and W. W. Hansen. Jul 67, 23p Rept no. 31
ECOM-01766-6
Contract DA-28-043-AMC-01766 (E)
See also AD-439 660.

Descriptors: (*Electron tubes, Microminiaturization (Electronics)), (*Electron bombardment, Photons), Manufacturing methods, Films, Molybdenum, Instrumentation, Diodes (Electron tubes), Aluminum compounds, Photomicrography, Vacuum apparatus, Dielectrics, Oxides, Effectiveness, Vapor plating.

Recent progress in the development of micron-size field emission diodes is reported. There has been a continuing difficulty in forming asperities on the molybdenum areas at the bases of micron-diameter cavities despite good results with bare molybdenum films. During this quarter, investigations of source-to-substrate configurations confirmed that asperity density is dependent on the angular displacement of the source and substrate axes used during the deposition of molybdenum cathode films. Also, it was found possible to grow asperities on molybdenum films deposited at normal incidence to the substrate but originating from source areas in the range from about 20 degrees to 50 degrees relative to the source axis. The influence of the vacuum environment, substrate temperature during molybdenum deposition, and aluminum thickness were then investigated for a fixed configuration (45 degrees source angle, normal incidence on substrate). The results indicate the following: asperity growth is optimum in residual gas pressures of the order of 0.000001 torr; the aluminum thickness should be about 200A or less; and the growth process is insensitive, over wide limits, to the substrate temperature used during molybdenum deposition. Moreover, it was found possible to grow asperities on a molybdenum surface over which aluminum oxide had previously been deposited and etched away (i.e., similar to the molybdenum areas at the bottoms of cavities) without the necessity for first depositing a fresh layer of molybdenum. Specimens with micron-diameter diode cavities have been subjected to the asperity formation process and are awaiting electrical tests for field emission activity. (Author)
AD-657 234 HC$3.00 MF$0.65

MICROWAVE FILTERS UTILIZING DIELECTRIC RESONATORS.
Rept. no. 12, 15 Dec 66-15 Mar 67 (Final),
Rantec Corp Calabasas Calif
W. H. Harrison. Jul 67, 42p
ECOM-02088-4
Contract DA-28-043-AMC-02088 (E)

Descriptors: (*Filters (Electromagnetic wave), *Resonators), Dielectric properties, Band-pass filters, Temperature, Design, Performance (Engineering), Response, Tuning devices, Frequency.

Temperature compensation methods employed throughout the study program are briefly reviewed. Satisfactory temperature compensation has not been achieved. Several coupling structures were successfully designed permitting low loss coupling to the input and output resonators. A satisfactory tuning method has also been devised. The results of this program show that a band-pass filter employing dielectric resonators is practical to build, is compact, and approaches the performance of an equivalent waveguide filter. The design presented employs five resonators mounted in a cylindrical tube which is 1.4 inch diameter by 4.3 inches long and weighs 4.6 ounces. An equivalent waveguide filter would be approximately 2.3 x 4.5 x 16 inches long and weigh approximately 64 ounces (WR-430). (Author)
AD-657 236 HC$3.00 MF$0.65

LOW MAGNETIC SATURATION GARNETS.
Sperry Microwave Electronics Co Clearwater Fla
For primary bibliographic entry see Field 20C.
AD-657 240 HC$3.00 MF$0.65

COHERENT, TUNABLE, CW OSCILLATIONS IN A SMOOTH-BORE MAGNETRON - THE PLASMA MAGNETRON,
Florida Univ Gainesville Electron Devices Lab
A. D. Sutherland. Jul 67, 140p Rept no. PM-2
AFOSR-67-1663
Grants AF-AFOSR-839-66, AF-AFOSR-839-67

Descriptors: (*Magnetrons, Coherent radiation), (*Plasma oscillations, Magnetrons), Oscillation, Cyclotron waves, Microwaves, Resonance.

Coherent, CW oscillations are generated in a smooth-bore magnetron when the end plates are operated at anode potential allowing the electrons of the discharge free access to them. These oscillations, which occur in a 'coaxial cavity' whose lowest order resonant (TEM) mode is about 8.5 GHz, are continuously tunable over the frequency range from 800 mHz to 3,000 mHz by varying the magnetic field. The frequency is nearly, but not exactly, the electron cyclotron frequency. For this reason, this oscillation is referred to as the 'cyclotron mode', to distinguish it from other 'geometry-dependent' modes which are observed to appear only with critical values of discharge current and magnetic field. Both modes of oscillation are observed only with pressure below 1 micron. At higher pressures, a plasma forms and oscillations, when observed, have the character of wide-band peaks of 'hash'.
AD-657 359 HC$3.00 MF$0.65

LOW TEMPERATURE INFRARED PHOTOCONDUCTORS.
RCA Labs Princeton N J
For primary bibliographic entry see Field 20F.
AD-657 445 HC$3.00 MF$0.65

FEASIBILITY STUDY 19.2KBS IN A 3KHZ CHANNEL.
Stelma Inc Stamford Conn
For primary bibliographic entry see Field 17B.
AD-657 458 HC$3.00 MF$0.65

VISIBILITY ON CATHODE-RAY TUBE SCREENS: SIGNALS ON A P7 SCREEN SEEN AT DIFFERENT INTERVALS AFTER EXCITATION.

Johns Hopkins Univ Baltimore Md Dept of Psychology
For primary bibliographic entry see Field 20F.
AD-657 515 Not available from CFSTI.

VISIBILITY ON CATHODE-RAY TUBE SCREENS. SCREEN BRIGHTNESS,
Johns Hopkins Univ Baltimore Md
For primary bibliographic entry see Field 20F.
AD-657 520 Not available from CFSTI.

BROADBAND MODULATION OF HIGH-Q RESONATORS AT HIGH POWER LEVELS,
California Univ., Berkeley. Lawrence Radiation Lab.
Kenneth R. Mackenzie. 23 Feb 67, 45p
Contract W-7405-eng-48

Descriptors: (*Resonators, Broadband), (*Frequency modulation, Voltage), Transformers, Transmission lines, Direct current, Coupling circuits.

For abstract, see NSA 21 16.
UCRL-17372 HC$3.00 MF$0.65

9B. Computers

RESEARCH ON INTELLIGENT QUESTION-ANSWERING SYSTEM,
Stanford Research Inst Menlo Park Calif
Claude Cordell Green, and Bertram Raphael. May 67, 52p Rept no. Scientific-1
AFCRL-67-0370
Contract AF 19 (628)-5919

Descriptors: (*Learning machines, Decision making), (*Information retrieval, Man-machine systems), Algorithms, Computer programs, Computers, Time sharing.
Identifiers: List processing.

This report describes progress toward an 'intelligent question-answering system'--a system that can accept facts, retrieve items from memory, and perform logical deductions necessary to answer questions. Two versions of such a system have been implemented, and the authors expect these to be the first in an evolving series of question-answerers. The first system, QA1, is based upon relational information organized in a list-structured memory. The data consist of general facts about relations as well as specific facts about objects. QA1 has limited deductive ability. QA2 is based upon formal theorem-proving techniques. Facts are represented by statements in the predicate calculus. Although the memory organization is simpler than that of QA1, the sophisticated logical abilities of QA2 result in greater question-answering power. The report gives examples of the performance of QA1 and QA2 on typical problems that have been done by previous question-answerers, and describes plans for extending the capabilities of QA2. (Author)
AD-656 789 HC$3.00 MF$0.65

RESEARCH LABORATORY OF ELECTRONICS QUARTERLY PROGRESS REPORT NO. 86, JULY 15, 1967,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 20I.
AD-656 868 HC$3.00 MF$0.65

LINEAR CIRCUIT ANALYSIS BY MEANS OF A DIGITAL COMPUTER.
Royal Aircraft Establishment Farnborough (England)
For primary bibliographic entry see Field 9E.
AD-656 872 HC$3.00 MF$0.65

A COMPUTERIZED INVENTORY CONTROL SYSTEM,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 5A.
AD-656 900 HC$3.00 MF$0.65

SOVIET CYBERNETICS: RECENT NEWS ITEMS NO. 7,
Rand Corp Santa Monica Calif
Wade B. Holland. Aug 67, 73p Rept no. P-3600/7 TT-67-62623
See also AD-650 944.

Descriptors: (*Cybernetics, USSR), (*Computers, USSR), Automation, Photographs, Management engineering, Data processing systems, Shipborne.

Contents: Brief items; Soviet cybernetics highlights, 1966; Another critical look at computer industry; Dnepr-1 on board research ship (photograph); Mechanization and automation hardware output, 1958-66; More from Gvishiani on industrial management; Organizational chart of sigma association; Glushkov on philosophical problems of cybernetics; Whom does cybernetics serve: 1953 Attack on Cybernetics; Future developments in computer design; Articles and photographs in the Soviet press, July 1967.
AD-657 004 HC$3.00 MF$0.65

DATA AUTOMATION DEVELOPMENT AND SYSTEMS IMPLEMENTATION -- SOME PROBLEMS AND CONCLUSIONS,
Rand Corp Santa Monica Calif
A. E. Wessel. Aug 67, 31p Rept no. P-3648
Prepared for presentation at International Patent Officer's Assoc., Stockholm (Sweden), 18-23 Sep 67.

Descriptors: (*Data processing systems, Systems engineering), (*Information retrieval, Patents), Automation, Man-machine systems, Decision making, Control systems, Programming (Computers).
Identifiers: JOSS.

This report contains the author's views concerning the development and implementation of data automation or information processing systems over the past decade. In addition it considers an ongoing experimental patent search system being implemented by the research and development people of the U. S. Patent Office in conjunction with The RAND Corporation.
AD-657 005 HC$3.00 MF$0.65

COMPUTER AIDS FOR AEROSPACE DESIGN AND ENGINEERING: INNOVATION, ECONOMICS AND PUBLIC POLICY,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 5A.
AD-657 009 HC$3.00 MF$0.65

MAXIMIZING FLOW THROUGH A NETWORK WITH NODE AND ARC CAPACITIES,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 9E.
AD-657 011 HC$3.00 MF$0.65

THREE FORTRAN PROGRAMS THAT PERFORM THE COOLEY-TUKEY FOURIER TRANSFORM.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 12A.
AD-657 019 HC$3.00 MF$0.65

THE FRANK J. SEILER RESEARCH LABORATORY,
Frank J Seiler Research Lab United States Air Force Academy Colo
For primary bibliographic entry see Field 14B.
AD-657 036 HC$3.00 MF$0.65

DISCREET SYSTEMS AND DIGITAL COMPUTER CONTROL.
State Univ of New York Stony Brook
Sheldon S. L. Chang. 1967, 9p
AFOSR-67-1883
Grant AF-AFOSR-542-67
Availability: Published in Applied Mechanics Reviews v20 n5 p429-37 May 1967.

Descriptors: (*Control systems, *Digital computers), Sampling, Time sharing, Errors, Linear systems, Feedback, Integral transforms, Random variables, Optimization, Nonlinear systems, Adaptive systems.
Identifiers: On-line systems.

The digital computer greatly multiplies the adaptive and learning capabilities of control systems. With the rapid development of high speed computers, the day soon may come that any engineering procedure of measurement and design which can be written into an algorithm can be used as part of an on-line adaptive or learning system. In such a system, the control law is always the best within limits of engineering know-how and the limited on-line as well as prior-test knowledge about the system. A basic limitation is that in writing the algorithm, the engineer has to foresee all possible developments, and specifies the immediate as well as learning response.
AD-657 041 Not available from CFSTI.

ON THE COMPUTATION OF THE NUMBER OF ELEMENTS IN COMBINATIONS OF SETS,
New York Univ N Y Dept of Industrial Engineering and Operations Research
For primary bibliographic entry see Field 12A.
AD-657 056 Not available from CFSTI.

CONVERGENCE PROOFS FOR GLUCKSMAN'S PROCEDURE.
Rept. for Dec 66-Aug 67,
Stanford Research Inst Menlo Park Calif
Richard O. Duda. Aug 67, 31p
Contract Nonr-3438 (00)

Descriptors: (*Learning machines, Training), (*Pattern recognition, Adaptive systems), Theorems, Convergence, Difference equations, Algorithms.

The standard error-correction procedures for training a linear machine terminate as soon as the training patterns have been separated. If the training set is small, the resulting hyperplane boundaries may be undesirably close to some of the patterns. To correct this situation, Glucksman has proposed a new training procedure which requires the boundaries to be at least some minimum distance from all of the training patterns. This report gives convergence proofs for two modifications of Glucksman's procedure. In both cases, the distance delta used during training must be less than the maximum possible distance delta m. For the tw-category case, we show that convergence is guaranteed for any delta < delta m. For the R-category case, we can guarantee convergence if delta is less than some fraction of delta m. The results of applying Glucksman's procedure to two- and ten-category problems using Highleyman's data are given. (Author)
AD-657 171 HC$3.00 MF$0.65

SELF-REPAIR TECHNIQUES INVESTIGATION.
Rept. no. 4, 1 Jun 66-31 May 67 (Final),
Westinghouse Electric Corp Baltimore Md Surface Div
F. B. Cole, and S. E. Zimmerman. Aug 67, 108p
Rept no. MDE-2566
ECOM-02343-F
Contract DA-28-043-AMC-02343 (E)

Descriptors: (*Digital systems, Maintenance), Coding, Reliability, Errors, Computer logic, Relaxation oscillators, Logic circuits, Data storage systems.
Identifiers: Error-correcting codes, Computer hardware, Self-repairing systems.

The report describes a set of techniques which can be used to design and construct self-repairing digital systems with spare parts switching. Both the problem of fault detection and location and the problem of spare switching are discussed. Residue coding for arithmetic unit fault detection and location is discussed and rejected. Then, duplication techniques for both fault location and repair are discussed. A design plan is given for a demonstration model to demonstrate self-repair techniques. The design plan includes logic equations, timing diagrams, and a detailed operational description. Finally, recommendations are made for future efforts. (Author)
AD-657 247 HC$3.00 MF$0.65

AN ON-LINE SYSTEM FOR ALGEBRAIC MANIPULATION.
Doctoral thesis,
Massachusetts Inst of Tech Cambridge
Robert Ross Fenichel. Jul 66, 115p Rept no. MAC-TR-35
Contract Nonr-4102 (01)
Rept. on proj: MAC. Prepared in cooperation with Harvard Univ., Cambridge, Mass.

Descriptors: (*Programming (Computers), Algebra), Algorithms, Theses, Time sharing, Subroutines, Real time, Theorems, Computer programs.
Identifiers: MAC project, On-line systems, FAMOUS.

FAMOUS is an on-line system for the manipulation of linguistic forms. Although these forms can have quite arbitrary interpretations, the standard interpretation is that they are algebraic expressions. FAMOUS allows its 'algebraic expressions' to include arbitrary functions which may or may not be defined. In this way, regular non-algebraic constructions may be concealed as arguments of ad hoc functions. Rules of local change are the heart of FAMOUS, and supplied by the user. Using these rules, FAMOUS looks at an algebraic manipulation as a series of local changes. The centrality of proximity in FAMOUS was orginally prompted by G-theory, which might be called the study of proximity. The presentation in Chapter II is complete, but it has rather a cookbook tone. Chapter III is a more reflective attempt to define the power and nature of the system. Algebraic 'simplification' has been a benchmark of algebraic manipulators, and it is discussed in Chapter IV. A more novel application, that of limit problems, is discussed in Chapter V. Finally, Chapter VI consists of miscellaneous remarks about possible and impossible lines of further work. (Author)
AD-657 282 HC$3.00 MF$0.65

SYMBOLIC MATHEMATICAL LABORATORY.
Massachusetts Inst of Tech Cambridge
For primary bibliographic entry see Field 12A.
AD-657 283 HC$3.00 MF$0.65

JOSS: ACCOUNTING AND PERFORMANCE MEASUREMENT,
Rand Corp Santa Monica Calif
G. E. Bryan. Jun 67, 69p Rept no. RM-5217-PR
Contract F44620-67-C-0045

Descriptors: (*Data processing systems, Performance (Engineering)), (*Programming (Computers), Costs), Time sharing, Input-output devices, Data storage systems, Statistical processes, Computer programs, Management planning.
Identifiers: JOSS, On-line systems.

The monitor is that part of the JOSS system program that acts as the supervisory unit of the JOSS machine. A major function of the monitor is the gathering of data for revenue accounting and for producing performance measures of the system and its users. The present memorandum includes detailed descriptions of the data gathering processes for accounting and performance measurement, together with samples of the several reports produced from these data. A future memorandum will deal in depth with JOSS system and user performance as measured by the reporting processes described here.
AD-657 314 HC$3.00 MF$0.65

OPERATION INSTRUCTIONS AND DESCRIPTION OF COMPUTER PROGRAM FOR FINITE DIFFERENCE SOLUTIONS OF THE LAMINAR COMPRESSIBLE BOUNDARY LAYER EQUATIONS IN THE VON MISES VARIABLES,
New York Univ N Y Dept of Aeronautics and Astronautics
For primary bibliographic entry see Field 20D.
AD-657 322 HC$3.00 MF$0.65

THE SYSTEMS GAP,
Rand Corp Santa Monica Calif
Paul Armer. Aug 67, 8p Rept no. P-3641
Prepared for presentation in Datamation Aug 1967.

Descriptors: (*Computers, USSR), (*Cybernetics, State-of-the-art reviews), Economics, Feedback, Machines, Maintenance, Spare parts, Reliability (Electronics), Magnetic tape.

The author discusses the state of the computer art in the USSR and comes to the inescapable conclusion that there exists a computer gap between the U.S. and the USSR.
AD-657 329 HC$3.00 MF$0.65

PROGRAM SOLUTIONS TO SPACE SCIENCE PROBLEMS,
International Business Machines Corp Cambridge Mass Cambridge Advanced Space Systems Dept
Louise Coury, and Koo Sun Kim. Aug 67, 60p Rept no. Scientific-1
AFCRL-67-0465
Contract AF 19 (628)-6065

Descriptors: (*Computer programs, Scientific research), (*Programming (Computers), Scientific research), Magnetic fields, Space probes, Ionosphere, Orbital trajectories, Astronomical observatories, Protons, Electrons, Radar, Terrestrial magnetism, Integration, Equations, Spacecraft, Telemetering data.

The report describes the analysis and programming required in the development of eight computer programs which cover a wide variety of scientific research. Some of these investigations are interrelated, such as the geomagnetic co-ordinate conversion and magnetic field determinations, while others range from radar-trajectory analysis to electromagnetic theory. For each case, this report describes the mathematical development as well as the programming aspects in order to more completely define the problems and increase their applicability. While the problem descriptions of this document are mathematically oriented, the sections explaining the programming aspects of each problem are designed to facilitate the use of the computer programs by programmer and scientist alike. The specific topics covered in this report are: Orbiting Geophysical Observatory (OGO), Scattering Integration Analysis (SCATT), Electromagnetic Integration Analysis (INTE), Trajectory Analysis for Single Station Radar (TRAJ-1), Proton and Electron Ionosphere Models (ION), Magnetic Field and B and L Determination (FIELD), Geomagnetic Co-ordinate Conversion (GEOMAG), Transcendental Equation Analysis (OPTIC). (Author)
AD-657 333 HC$3.00 MF$0.65

COMPUTER AND INFORMATION SCIENCES-II,
Battelle Memorial Inst Columbus Ohio Columbus Labs
Julius T. Tou. 1967, 382p
Proceedings of the Symposium on Computer and Information Sciences (2nd), held at Battelle Memorial Institute, August 22-24, 1966.
Availability: Hard copy available from Academic Press, Inc., 111 Fifth Avenue, New York, N. Y., $16.00.

Descriptors: (*Computers, Symposia), Stochastic processes, Optimization, Learning machines, Adaptive systems, Mathematical models, Pattern recognition, Decision theory, Automata, Control systems, Data storage systems, Indexes, Man-machine systems, Syntax, Algorithms.
Identifiers: On-line systems, Information sciences.

Contents: Interactive information processing; Optimization, adaptation, and learning in automatic systems; Recent work on theoretical models of biological memory; Some approaches to optimum feature extraction; Evaluation and selection of variables in pattern recognition; Some topics on nonsupervised adaptive detection for multivariate normal distributions; Nonlinear environments permitting efficient adaptation; Recognition of order and evolutionary systems; Stochastic automata as models of learning systems; Adaptive systems with a variable structure; Fundamental principle and behavior of learntrols; Preliminary design of an intelligent robot; Iterative storage of multidimensional functions in discrete distributed memories; A command language for visualization of articulated movements; Some approaches to automatic indexing; The nature of syntactic redundancy; On communicating with machines in natural language; A generalization of the linear threshold decision algorithm to multiple classes.
AD-657 347 Not available from CFSTI.

A PLAN FOR THE ESTABLISHMENT OF A COMPUTER-AIDED INSTRUCTION RESEARCH AND DEVELOPMENT CENTER.
General Learning Corp Washington D C
For primary bibliographic entry see Field 5I.
AD-657 348 HC$3.00 MF$0.65

INVESTIGATION AND CONTINUED DEVELOPMENT OF THE IDEALAB FOURIER TRANSFORM ANALOG COMPUTER.
Final rept. 1 Nov 65-31 Oct 66,
Idealab Inc Franklin Mass
A. H. Bullard. 1 Jun 67, 33p
AFCRL-67-0395
Contract AF 19 (628)-5653

Descriptors: (*Analog computers, Integral transforms), Relaxation oscillators, Performance (Engineering), Instruction manuals, Wiring diagrams, Calibration, Servomechanisms.

The report describes the modifications of the Idealab Fourier Transform analog computer and the results obtained from these modifications. Indicated in the report is the final figure of a resolution for an input of 2249 sin wave cycles within one frequency increment (14% of the (sin x)/x crossover). Also indicated in the report are the methods and circuitry used to obtain this accuracy and operator instructions for the new controls. Emphasis is placed on the electronic and engineering considerations of the monitor panel, white light actuator, velocity servo, precision clamp and oven control. A complete set of blue prints covering the modifications is provided at the end of the report. (Author)
AD-657 360 HC$3.00 MF$0.65

GEOPHYSICAL CONSTANT DETERMINATION FROM SATELLITE OBSERVATIONS: DIGITAL COMPUTER PROGRAM.
Martin Co Baltimore Md
For primary bibliographic entry see Field 8E.
AD-657 361 HC$3.00 MF$0.65

THRESHOLD ELEMENTS AND THE DESIGN OF SEQUENTIAL SWITCHING NETWORKS.
Interim technical rept. Mar 66-Mar 67,
Massachusetts Inst of Tech Cambridge Electronic Systems Lab

A. K. Susskind, D. R. Haring, C. L. Liu, R. L. Martin, and C. Ying. Jul 67, 316p
RADC-TR-67-255
Contract AF 30 (602)-3681

Descriptors: (*Switching circuits, *Computer logic), (*Shift registers, Feedback), Logic circuits, Synthesis, Reliability, Algorithms, Algebra, Functions.
Identifiers: Sequential machines, Threshold logic.

The report covers research performed from March 1966 to March 1967. The major topics treated are: (1) methods for finding weight-threshold vectors that realize a given switching function in multi-threshold linear logic; (2) synthesis of sequential machines by means of shift registers and simple variants of that form; (3) an on-line programming system for computer-aided shift-register synthesis of sequential machines; (4) the relationship between finite memory-span and shift-register synthesis; (5) studies of 'globally universal' switching functions; (6) methods for the synthesis of switching networks where signals can have more than two levels; and (7) universal circuit forms for sequential machines. (Author)
AD-657 370 HC$3.00 MF$0.65

A HAND-PRINTED CHARACTER RECOGNITION EXPERIMENT.
Technical rept.,
Northwestern Univ Evanston Ill Information-Processing and Control Systems Lab
W. J. Steingrandt, and S. S. Yau. Aug 67, 7p Rept no. TR-67-113
Contract N00014-67-A-0356-0003, Grant AF-AFOSR-98-65
Availability: Published in Unidentified journal.

Descriptors: (*Character recognition, Statistical processes), Pattern recognition, Random variables, Data storage systems, Probability, Decision making.

The experimental results for hand-printed character recognition based on line-pattern recognition as a second order Markov process are presented. After collecting 2,000 sample patterns for 10 hand-printed characters, this method shows 89.1% correct classification for patterns not in the training set. Some improvements for this approach are suggested. (Author)
AD-657 425 Not available from CFSTI.

COMPUTER-ASSISTED TEXT PREPARATION.
Maryland Univ College Park Computer Science Center
For primary bibliographic entry see Field 5B.
AD-657 457 HC$3.00 MF$0.65

ANALOGUE-DIGITAL-MAGNETIC TAPE CONVERSION SYSTEM,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
J. R. Morrey, and H. S. Gile. May 67, 198p
Contract AT (45-1)-1830

Descriptors: (*Programming (Computers), *Data processing systems), (*Magnetic tape, *Flow charting), Programming languages.

For abstract, see NSA 21 16.
BNWL-343 HC$3.00 MF$0.65

PERT-IV, A TWO-DIMENSIONAL PERTURBATION CODE IN FORTRAN-IV,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18K.
For abstract, see NSA 21 16.
BNWL-409 HC$3.00 MF$0.65

D MATRIX A COMPUTER PROGRAM FOR CALCULATING VALENCE FORCE COORDINATES IN TERMS OF ATOM DISPLACEMENTS OF A MOLECULE OR CRYSTAL,
Idaho Nuclear Corp., Idaho Falls.
For primary bibliographic entry see Field 20B.
For abstract, see NSA 21 16.
IN-1076 HC$3.00 MF$0.65

DEVELOPMENT OF CALCULATIONAL METHODS FOR FAST REACTOR SAFETY ANALYSIS AT LASL,
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 16.
LA-3683 HC$3.00 MF$0.65

A PROCEDURE FOR RANKING DIAGNOSTIC TEST INPUTS.
Illinois Univ., Urbana. Coordinated Science Lab.
T. J. Powell. May 67, 61p NASA-CR-87362, R-354
Contract DA-28-043-AMC-00073/E/
Supported By Nasa

Descriptors: *Diagnosis, *Digital computer, *Rank test, Component, Computer, Detection, Digital, Electronics, Failure, Input, Logic, Maintenance, Probability, Rank, Test.

For abstract, see STAR 05 19.
N67-33318 HC$3.00 MF$0.65

A DIGITAL COMPUTER PROGRAM FOR THE ANALYSIS AND DESIGN OF STATE VARIABLE FEEDBACK SYSTEMS.
Arizona Univ., Tucson.
For primary bibliographic entry see Field 9C.
For abstract, see STAR 05 19.
N67-33455 HC$3.00 MF$0.65

SOME CHARACTERISTICS OF HARDWARE AND SOFTWARE OF THIRD-GENERATION COMPUTERS.
European Space Data Centre, Darmstadt (West Germany).
K. Debatin. Dec 66, 17p ESRO-TM-52

Descriptors: *Computer programming, *Data processing, Characteristics, Computer, Data, Hardware, Large, Processing, Programming, Remote, Sharing, Software, Technology, Terminology, Time.

For abstract, see STAR 05 19.
N67-33638 HC$3.00 MF$0.65

MONTE CARLO CODE FOR SOLUTION OF PLANAR ELECTRON-DIODE PROBLEMS INCLUDING ELECTRON- NEUTRAL ELASTIC COLLISIONS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 20H.
For abstract, see STAR 05 19.
N67-33639 HC$3.00 MF$0.65

A UNIVERSAL PROGRAMMING LANGUAGE (ALGOL 60).
Air Force Systems Command, Wright- Patterson AFB, Ohio. Foreign Technology Div.
S. S. Lavrov. 23 Mar 67, 180p FTD-HT-66-382, TT-67-62148
Transl. Into English of the Book "universal'nyy Yazyk Programmirovaniya" Moscow, Izd. Nauka, 1964 P 1-171

Descriptors: *Algorithm, *Computer programming, *Machine language, *Manual, Coding, Computation, Computer, Description, Electronic, Expression, Language, Machine, Mathematics, Process, Programming, Structure, Symbol, Universal.

For abstract, see STAR 05 19.
N67-33836 HC$3.00 MF$0.65

THE LINEARITY EVALUATION OF A DC VOLTAGE TO PULSE-WIDTH CONVERTER.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
W. R. Crockett. Jan 67, 18p NASA-TM-X-55656, X-711-67-11

Descriptors: *Direct current (dc), *Linearity, *Pulse width, Analog, Analysis, Characteristic, Circuit, Converter, Least squares method, Pulse, Stability, Statistical, Temperature, Transfer, Voltage, Width.

For abstract, see STAR 05 19.
N67-33938 HC$3.00 MF$0.65

ORIC A FORTRAN IV CODE FOR COMPUTING OPTIMUM PLANT DESIGNS FOR THE DESALINATION OF SEAWATER AND THE PRODUCTION OF ELECTRICITY,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18L.
For abstract, see NSA 21 16.
ORNL-TM-1523 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

CALCULATION OF STOPPING POWER AND RANGE-ENERGY VALUES FOR ANY HEAVY ION IN NONGASEOUS MEDIA,
California Univ., Berkeley. Lawrence Radiation Lab.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 16.
UCRL-17314 HC$3.00 MF$0.65

CALCULATION OF INELASTIC ELECTRON SCATTERING BY NUCLEI,
Yale Univ., New Haven, Conn. Electron Accelerator Lab.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 16.
YALE-2726E-49 HC$3.00 MF$0.65

9C. Electronic and Electrical Engineering

RESEARCH LABORATORY OF ELECTRONICS QUARTERLY PROGRESS REPORT NO. 86, JULY 15, 1967,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 20I.
AD-656 868 HC$3.00 MF$0.65

AN EXPERIMENT IN BASIC AIRBORNE ELECTRONICS TRAINING. PART III. EFFECT OF REDUCTION IN PREVIOUS TRAINING UPON ABILITY TO LEARN OPERATIONAL EQUIPMENT,

Naval Personnel Research Activity San Diego Calif Navy Training Research Lab
For primary bibliographic entry see Field 5I.
AD-656 893 HC$3.00 MF$0.65

THE FUNCTIONAL CONTEXT METHOD OF INSTRUCTION,
George Washington Univ Alexandria Va Human Resources Research Office
For primary bibliographic entry see Field 5I.
AD-656 939 Not available from CFSTI.

A STANDING-WAVE METHOD FOR THE MICROWAVE EVALUATION OF DIELECTRIC AND MAGNETIC MATERIALS.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 14B.
AD-657 055 HC$3.00 MF$0.65

SENSITIVITY REDUCTION USING OPTIMALLY DERIVED CONTROLLERS.
Illinois Univ., Chicago. Dept. of Electrical Engineering.
J. P. Herner. May 67, 43p NASA-CR-87363, R-353
Contract DA-28-043-AMC-00073/E/
Supported By Nasa

Descriptors: * Automatic control, * Feedback control system, * Linear system, * Sensitivity, Automatic, Control, Design, Feedback, Linear, Optimization, Parameter, Problem, Reduction, Regulator, Solution, Structure, System, Theory.

For abstract, see STAR 05 19.
N67-33319 HC$3.00 MF$0.65

RESEARCH AND DEVELOPMENT PROGRAMS QUARTERLY REPORT, JAN. - MAR. 1967.
Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
For primary bibliographic entry see Field 20D.
For abstract, see STAR 05 19.
N67-33361 HC$3.00 MF$0.65

A DIGITAL COMPUTER PROGRAM FOR THE ANALYSIS AND DESIGN OF STATE VARIABLE FEEDBACK SYSTEMS.
Arizona Univ., Tucson.
J. L. Melsa. Aug 67, 52p NASA-CR-850
Grant NSG-490

Descriptors: * Computer program, * Linear system, * Matrix analysis, * Systems design, Algebra, Analysis, Block, Closed, Computer, Design, Diagram, Digital, Feedback, Formulation, Function, Linear, Loop, Manipulation, Matrix, Open, Phase, Plant, Program, State, System, Transfer, Variable.

For abstract, see STAR 05 19.
N67-33455 HC$3.00 MF$0.65

MONTE CARLO CODE FOR SOLUTION OF PLANAR ELECTRON-DIODE PROBLEMS INCLUDING ELECTRON- NEUTRAL ELASTIC COLLISIONS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 20H.
For abstract, see STAR 05 19.
N67-33639 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

9D. Information Theory

A MODIFIED VERSION OF PRICE'S THEOREM.
Revised ed.,
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
Robert F. Pawula. 7 Dec 66, 7p
AROD-5133:52-P
Contract DA-31-124-ARO (D)-257, ARPA Order-0570
Revision of manuscript submitted 12 Aug 66.
Availability: Published in IEEE Transactions on Information Theory vIT-13 n2 p285-8 Apr 1967.

Descriptors: (*Information theory, Statistical analysis), Random variables, Probability density functions, Operators (Mathematics), Partial differential equations, Statistical distributions, Theorems, Nonlinear systems.
Identifiers: Price's theorem.

Price's theorem for zero-memory nonlinear devices with Gaussian inputs is modified to make the theorem more amenable to the analysis of functions of more than two Gaussian variates. In the general case a single ordinary differential equation for the output correlation function is derived. Several examples illustrate the applicability of the modified version. (Author)
AD-656 791 Not available from CFSTI.

RESEARCH LABORATORY OF ELECTRONICS QUARTERLY PROGRESS REPORT NO. 86, JULY 15, 1967,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 20I.
AD-656 868 HC$3.00 MF$0.65

AN INVESTIGATION OF SEQUENTIAL SEARCH ALGORITHMS.
Operations Research Inc Silver Spring Md
For primary bibliographic entry see Field 12B.
AD-657 050 HC$3.00 MF$0.65

A SECOND MOMENT EXPONENTIAL ERROR BOUND FOR PEAK LIMITED BINARY SYMMETRIC COHERENT CHANNELS AT LOW SNR.
Research paper,
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
Joseph M. Aein. Jul 67, 45p Rept no. RP-P-341
IDA/HQ-67-6201
Contract DAHC15-67-C-0011

Descriptors: (*Information theory, Boundary value problems), (*Radio relay systems, Errors), Signal-to-noise-ratio, Communication satellites (Active), Limiters, Radio repeaters.

An exponential-type bound on error rate, Pe, for peak limited binary coherent channels operated at low SNR is presented. The bound depends exponentially only on the first and second moments of the channel output and serves to justify, in part, the use of SNR calculations for error rate performance. It is assumed that the receiver output, V, is given by a simple sum of n (= (TW)) identically distributed, independent random variables w sub i, each of which is decomposable into the sum of two independent random variables, z sub i and eta sub i, i.e., w sub i = z sub i + eta sub i. The z sub i are peak-limited by B sub z, numerical value of z sub i < or = B sub z, whereas eta sub i are normal (0, sq sigma). The z sub i represent the output of a peak-limited channel and the eta sub i represent any post channel receiver thermal noise (which may be zero, sq sigma = 0). For example, the z sub i may represent the output of a bandpass limited satellite repeater, with an interference input in addition to the desired signal, and eta sub i the front-end noise in a receiving ground station. (Author)
AD-657 167 HC$3.00 MF$0.65

RANDOM BINARY SEQUENCES.
Research rept.,
Naval Weapons Center China Lake Calif
W. O. Alltop. Aug 67, 10p Rept no. NWC-TP-4394

Descriptors: (*Coding, *Sequences), Sampling, Random variables, Approximation (Mathematics), Binary arithmetic, Correlation techniques, Information theory.
Identifiers: Autocorrelation function.

Two coding problems are considered. One is to obtain binary codes with desirable auto-correlation functions. The other is to obtain families of such codes with desirable cross-correlation functions. The results of a random computer search for the codes are described. An approximation to the expected number of trials in a search for families of codes is also presented. (Author)
AD-657 307 HC$3.00 MF$0.65

ERROR BOUNDS FOR CONVOLUTIONAL CODES AND AN ASYMPTOTICALLY OPTIMUM DECODING ALGORITHM.
Revised ed.,
California Univ Los Angeles Dept of Engineering
Andrew J. Viterbi. 14 Nov 66, 11p
AFOSR-67-1927
Grant AF-AFOSR-700-65
Revision of manuscript submitted 20 May 66.
Availability: Published in IEEE Transactions on Infoory, Shift registers, Optimization, Theorems, Mathematical analysis.
Identifiers: Convolutional code, Likelihood.

The probability of error in decoding an optimal convolutional code transmitted over a memoryless channel is bounded from above and below as a function of the constraint length of the code. For all but pathological channels the bounds are asymptotically (exponentially) tight for rates above R0, the computational cutoff rate of sequential decoding. As a function of constraint length the performance of optimal convolutional codes is shown to be superior to that of block codes of the same length, the relative improvement increasing with rate. The upper bound is obtained for a specific probabilistic nonsequential decoding algorithm which is shown to be asymptotically optimum for rates above R0 and whose performance bears certain similarities to that of sequential decoding algorithms. (Author)
AD-657 409 Not available from CFSTI.

AN EFFICIENT CODING SYSTEM FOR DEEP SPACE PROBES WITH SPECIFIC APPLICATION TO PIONEER MISSIONS.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
L. B. Hofman, and D. R. Lumb. Aug 67, 42p
NASA-TN-D-4105
Contract 125-23-02-02-00-21

Descriptors: *Coding system, *Deep space, *Pioneer space probe, *Telemetry, Application, Channel, Coding, Convolution, Decoding, Detection, Encoding, Error, Filter, Gauss, Link, Sequence, Signal, System.

For abstract, see STAR 05 19.
N67-33270 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

9E. Subsystems

LINEAR CIRCUIT ANALYSIS BY MEANS OF A DIGITAL COMPUTER.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
C. C. Cradwick. Jan 67, 29p Rept no. RAE-TR-67012

Descriptors: (*Electrical networks, Mathematical analysis), (*Computer programs, Electrical networks), Linear systems, Digital computers, Design, Matrix algebra, Costs.

Only quite simple electronic circuits can normally be analysed exactly by manual means, due to the labor involved in solving the circuit equations. This report is an introduction to the use of a digital computer to overcome this problem. A general purpose programme is described which will analyse linear circuits, containing both passive and active elements, of up to 50 nodes, and the underlying circuit analysis is discussed in some detail. (Author)
AD-656 872 HC$3.00 MF$0.65

A TRANSISTOR OPERATIONAL AMPLIFIER,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
I. B. Mullis, Jr. Jun 56, 19p Rept no. CF-2548
Contract NOrd-7386

Descriptors: (*Transistor amplifiers, Design), Circuits, Wiring diagrams, Performance (Engineering), Silicon.

An operational amplifier has been designed using transistors for missile control system use. This report discusses the experimental design and the engineering performance of the amplifier.
AD-656 883 HC$3.00 MF$0.65

PHASED ARRAY ANTENNA DEVELOPMENT.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
J. Frank. Mar 67, 178p Rept no. TG-882
Contract NOw-62-0604

Descriptors: (*Phased arrays, C band), Phase shifters, Ferrites, Power dividers, Antenna feeds, Design, Performance (Engineering), Antenna radiation patterns, Gain, Standing wave ratios, Efficiency.

The ability to rapidly scan a highly directive antenna beam has been made possible by recent advances in the art of microwave phase shifting. This report describes an experimental C-band phased array antenna. The antenna is composed of eight subarrays which may be arranged in several configurations to investigate the effects of a full array. Each subarray contains a reactive power divider, 48 ferrite phase shifters and their electronic drivers, and a radiating structure. The radiating structure has been designed to provide some compensation for impedance variation with scanning. The design and fabrication of the components are discussed in detail, and test results of the array are presented and analyzed. (Author)
AD-656 888 HC$3.00 MF$0.65

AN ACTIVE FILTER FOR FUZE POWER SUPPLIES,
Harry Diamond Labs Washington D C
Joseph A. Kreck. Jun 67, 40p Rept no. HDL-TM-67-13

Descriptors: (*Electric filters, Fuzes (Ordnance)), Active, Power supplies, Batteries + components, Attenuation, Proximity fuzes, Capacitance, Design, Coupling circuits.

Ripple, noise, step changes in voltage, and high AC impedance are common faults of fuze batteries which can be corrected by the use of ripple filter. A low-cost filter can attenuate these undesirable signals by at least 20 dB. The ripple filter acts as a capacitance multiplier, and gives the effect of producing a large shunt capacitance across the battery. The filter reduces the AC impedance of the battery without affecting its DC internal resistance. This report covers a convenient design procedure as well as theory and performance. (Author)
AD-656 926 HC$3.00 MF$0.65

MAXIMIZING FLOW THROUGH A NETWORK WITH NODE AND ARC CAPACITIES,
Rand Corp Santa Monica Calif
R. D. Wollmer. Jul 67, 41p Rept no. RM-5383-PR
Contract N44620-67-C-0045

Descriptors: (*Networks, Theory), (*Linear programming, Mathematics), Logistics, Algorithms, Real time, Transportation, Computer storage devices, Magnetic core storage, Electric arcs, Theorems.

A method for maximizing the flow from source to destination along a transportation network whose nodes and arcs have limited capacities. An algorithm is derived that eliminates the need for artificial arcs and nodes used in the flow-augmenting method of Fulkerson and Ford. This simplification should provide a substantial savings in computer time and core storage. The problem is formulated as a linear program. For all nodes other than the source and sink, the node capacity may be expressed either as the flow into or out of the node, since these two quantities are equal. For the source and sink, the node capacity must be expressed in terms of the greater of the two quantities. Thus the source node capacity limits flow out of the source, while the sink capacity limits flow into the sink. The solution method used, a cut set approach, is a generalization of Ford and Fulkerson's labeling method. (Author)
AD-657 011 HC$3.00 MF$0.65

THE STUDY OF COMPLIMENTARY POLYNOMIALS IN A NETWORK SENSE,
Case Inst of Tech Cleveland Ohio
Harvey R. Algeri. Jul 67, 34p Rept no. Scientific-18
AFCRL-67-0376
Contract AF 19 (628)-1699

Descriptors: (*Circuits, Theory), (*Electrical networks, Mathematical analysis), Polynomials, Theorems, Matrix algebra, Electrical impedance.
Identifiers: Ladder networks.

Given the polynomial P1 in s, a lossless ladder network with all its transmission zeros at infinity can be associated with it. Another Hurwitz Polynomial P2 can be obtained from the denominator of the input impedance of the associated network with one ohm termination. P1 and P2 can be used to specify the properties of the network in terms of the usual impedance functions. When P1 is chosen to be the Butterworth Polynomial P2 can be obtained directly from the coefficients of P1 in a very simple manner. (Author)
AD-657 047 HC$3.00 MF$0.65

NATURE AND OPTIMISATION OF THE GROUND (LATERAL) WAVE EXCITED BY SUBMERGED ANTENNAS.
Revised ed.,
Polytechnic Inst of Brooklyn N Y Dept of Electrophysics
D. Staiman, and T. Tamir. 4 Apr 66, 14p
AFOSR-67-1862
Contract AF 49 (638)-1402
Revision of manuscript submitted 25 Jan 66.
Availability: Published in Proc. IEE v113 n8 p1299-310 Aug 1966.

Descriptors: (*Dipole antennas, Antenna radiation patterns), Underwater, Underground, Radio waves, Sea water, Propagation.

The radiation of a dipole immersed in a conducting dielectric halfspace bounded by air is examined by employing a representation which resolves the field into a spacewave, a lateral wave and lower-order diffraction terms. At points away from the interface between the two media the far field is given primarily by the spacewave which appears as a geometric optical-ray contribution. However, at points close to the air-dielectric boundary, the field (referred to as a groundwave) is dominated by the lateral wave, the quasioptical properties of which are discussed in detail. It is shown that the groundwave may be enhanced by orienting the dipole in a direction which optimises the excitation of the lateral wave. The optimum condition is obtained as a function of the properties of the lossy medium, and it is shown that, for small conductive losses, the groundwave is strongest when the free-spaced radiation of the dipole is directed at an angle close to the critical angle of reflection in geometrical optics. For large losses the optimum orientation is realised when the dipole is nearly parallel to the interface, in agreement with previous results. Quantitative results are presented for the fields produced under these optimum conditions; calculations are given over wide frequency ranges for representative cases of grounds consisting of dry earth, moist earth or seawater. (Author)
AD-657 090 Not available from CFSTI.

INTEGRATED DIRECT-COUPLED GYRATOR,
Stanford Univ Calif Stanford Electronics Labs
H. T. Chua, and R. W. Newcomb. 4 Apr 67, 4p
AFOSR-67-1886
Contracts F44620-67-C-0001, Nonr-225 (83)
Availability: Published in Electronics Letters v3 n5 p182-4 May 1967.

Descriptors: (*Phase shifters, Integrated circuits), Design, Diodes (Semiconductor), Resistors, Transistors.

An integrated gyrator is described. The device uses 1 diode, 12 resistors and 9 transistors, two of which are lateral p-n-p. Experimental results on gyration resistance, input impedance and resonant-circuit Q factor show excellent agreement with theory. (Author)
AD-657 108 Not available from CFSTI.

CERAMIC ROD ANTENNAS,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
E. A. Beck, and D. T. Collins. 17 Apr 57, 7p Rept no. CF-2637
Contract NOrd-7386

Descriptors: (*Antennas, Rods), (*Alumina, Antennas), Aluminum compounds, Oxides, Antenna radiation patterns, Ceramic materials, Configuration, Dielectrics, Gain.

Radiation patterns of several rod antennas made of sintered aluminum oxide are shown. Some of the characteristics of this material are discussed and compared with the presently used antenna material. It is also possible to accurately predict the beamwidth of these antennas. The advantages of tapering the antenna are also discussed. (Author)
AD-657 113 HC$3.00 MF$0.65

PARAMETRIC AMPLIFIER INTERIM WEATHER FIX.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17I.
AD-657 118 HC$3.00 MF$0.65

A TRANSISTOR D-C NEGATIVE IMMITTANCE CONVERTER,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
M. A. Karp. May 56, 53p Rept no. CE-2524
Contract NOrd-7386

Descriptors: (*Frequency converters, Transistors), Direct current, Negative resistance circuits, Electrical impedance, Admittance, Stability.

The ideal converter has a voltage transfer of minus one, a current transfer of unity, and acts like an ideal transformer with a negative input immittance. The circuits described are similar to those suggested by Linvill with one important difference. Due to the fact that there are two basic kinds of transistors, NPN and PNP, one may cascade transistors without resorting to coupling condensers. This fact is used with the result that a zero frequency converter is obtained consisting of two transistors and four resistors. Negative resistances may be obtained in a variety of ways. One specific configuration that converts a passive load to its negative is described using the small signal equivalent circuit to obtain various limiting conditions imposed upon the transistor and the frequencies of conversion. Equations are derived to permit the design of a specific converter. Due to the direct coupling the question of temperature sensitivity is discussed. One obvious use of a negative immittance is in oscillator circuits.
AD-657 144 HC$3.00 MF$0.65

TRANSMISSION-LINE DISTRIBUTED AMPLIFIERS UTILIZING FIELD-EFFECT TRANSISTORS.
Technical rept.,
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
J. B. Hopkins, and A. A. Pandiscio. Jul 67, 337p
Rept no. TR-534
Contracts Nonr-1866 (16), Nonr-1866 (07)

Descriptors: (*Distributed amplifiers, Transmission lines), (*Field effect transistors, Distributed amplifiers), Helixes, Performance (Engineering), Capacitance, Gain.

The purpose of this investigation is the determination of operating characteristics of a distributed amplifier utilizing field-effect transistors as active elements and constructed in the form of helical transmission lines. A review of the properties of field-effect transistors is carried out, and the amplifier is analyzed in terms of transmission line equations, taking the input and output lines to be loaded by the FET input and output impedances, respectively. After equations are obtained which characterize such loaded transmission lines, and suitable terminations are described, an overall gain expression is developed, forming the basis of a computer simulation of the amplifier. In addition, general relations concerning design specifications and final amplifier performance are obtained from simple models and checked against the more elaborate simulation. Problems associated with transistor gate-drain (feedback) capacitance are examined in a variety of ways. Pulse response and variation of gain with frequency are investigated by means of the computer simulation for a variety of transistor and amplifier specifications. The construction and testing of experimental amplifiers utilizing both junction and MOS (depletion) FET's is described and shows satisfactory agreement with theory. Bandwidths exceeding 200 Mc. at a gain of two have been achieved, using transistors with a gain-bandwidth product of 50 Mc. The principal limitations found at present are the low transconductance -- leading to low gain -- and cutoff frequency of currently available FET's. (Author)
AD-657 170 HC$3.00 MF$0.65

A PERTURBATIONAL ANALYSIS OF NORTON TYPE CONSTANT-RESISTANCE NETWORKS,
California Univ Berkeley
C. A. Desoer, and K. K. Wong. 16 Nov 66, 14p
AROD-5177:18
Grants DA-ARO (D)-31-124-G576, NSF-GK-716
Availability: Published in Int. J. Engng Sci v5 p415-26 1967.

Descriptors: (*Networks, Perturbation theory), Identification, Resistance (Electrical), Analysis.

It is shown that in order that a Norton high-pass, low-pass complementary ladder network be a constant resistance, all its reactive elements must be linear. The proof requires a novel perturbational analysis of nonlinear networks which gives precise bounds, in terms of the input, of the effect of the nonlinearities. This type of perturbational analysis can be considered to be a contribution to the identification problem. (Author)
AD-657 265 Not available from CFSTI.

INVESTIGATION OF USE OF SUPERIMPOSED SURFACE WAVE MODES. PART II.
Final rept. (Part 2) 1 Feb 66-31 Jan 67,
Hughes Aircraft Co Fullerton Calif
N. S. Wong, and R. Tang. 28 Feb 67, 103p Rept no. FR-67-14-151-Pt-2
AFCRL-67-0171-Pt-2
Contract AF 19 (628)-4984
See also AD-631 936, Part 1.

Descriptors: (*Phased arrays, Impedance matching), (*Antenna arrays, *Impedance matching), Waveguides, Standing wave ratios, Design, Electrical impedance, Antenna radiation patterns, Phase shifters, Power dividers, Scanning, Antenna components, Coupling circuits.

A novel method of achieving a matched radiating element in a phased array antenna over a wide scan angle has been investigated. This method has been applied in the design of an experimental linear array of 41 elements. Each radiating element consists of an open-ended waveguide driven by an end-on coaxial transition in conjunction with offset posts for the appropriate excitation of the two lowest order modes. The measured input VSWR over a 55 degree scan angle was less than 1.5 on this experimental linear array. This result agreed fairly well with the predicted value. In addition, no degradation on the array pattern due to edge effect was observed on the experimental array with all the elements matched over the 55 degrees scan range. (Author)
AD-657 289 HC$3.00 MF$0.65

A STABILITY THEORY FOR NON-LINEAR DISTRIBUTED NETWORKS.
Technical rept.,
Syracuse Univ N Y
Alan N. Willson, Jr. Jul 67, 124p Rept no. EE-1258
RADC-TR-67-328
Contract AF 30 (602)-3538

Descriptors: (*Networks, Theory), Electrical networks, Circuits, Stability, Nonlinear systems, Transmission lines, Differential equations, Equations.

Electrical networks consisting of lumped linear and memoryless non-linear elements and an arbitrary number of lossless transmission lines are considered. It is shown that a large class of such networks may be described by a system of functional differential equations. Several examples of the theory are presented. (Author)
AD-657 342 HC$3.00 MF$0.65

ELECTRICALLY-SMALL, SUPERCONDUCTING ANTENNAS.
Final rept. 1 Mar 66-28 Feb 67,
Dayton Electronic Products Co Inc Ohio
Bernhard M. Schmidt. Apr 67, 152p
AFCRL-67-0200
Contract AF 19 (628)-5893

Descriptors: (*Antennas, Superconductivity), Miniature electronic equipment, Coupling circuits, Antenna components, Dielectrics, Cryogenics, Signal-to-noise ratio, Dipole antennas, Field theory.

The advantages and limitations of electrically-small, superconducting antennas were investigated. The study led to a consideration of miniaturization, physical shape factors, long range magnetic coupling, maximum signal levels, antenna-receiver interface problems, materials, structures, and potential antenna applications of the quantum effects in superconductors. In addition, natural cooling and superdirectivity were incidental but relevant topics. In general, it was found that the possibility for miniaturization represents the principal advantage of the superconducting antenna, especially at the lower frequencies where antennas often are electrically-small through physical necessity. Radiation efficiency is increased in transmitting antennas, but at the expense of bandwidth. The degree of usefulness of superconductivity in receiving antennas depends considerably on the low noise properties and input impedance of the receiver and on the environment of the antenna. Any cooling improves the performance of the antenna; in fact, except in the case of the perfect receiver, there is some question as to which is more effective, the low temperature or the superconducting mode. (Author)
AD-657 376 HC$3.00 MF$0.65

A STUDY OF FACTORS AFFECTING OPERATION OF THE VG REMOTE PPI,
Johns Hopkins Univ Baltimore Md Psychological Lab
For primary bibliographic entry see Field 17I.
AD-657 477 HC$3.00 MF$0.65

ANTENNA RESEARCH SCIENTIFIC REPORT, 1 MAY 1966 - 31 JAN. 1967.
Technische Hochschule Munchen (West Germany). Institut Fur Hochfrequenztechnik.
H. H. Meinke. 1 Feb 66, 94p SR-1, AD-648850
Contract AF 61/052/-950

Descriptors: *Antenna, *Radiator, *Transistor, Broadband, Capacity, Cavity, Current, Electric, Frequency, Impedance, Integration, Matching, Plane, Radiation, Resonance, Small, Spiral, Top.

For abstract, see STAR 05 19.
N67-33458 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

9F. Telemetry

APOLLO TELEMETRY FRAME SYNCHRONIZATION TECHNIQUES.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
T. W. Coleman, and J. W. McIntyre. May 67, 71p Rept no. TG-917
Contract NOw-62-0604

Descriptors: (*Telemeter systems, Synchronization (Electronics)), Spacecraft, Control systems, Switching circuits, Errors, Probability, Tables.
Identifiers: Apollo.

An analysis has been made of data frame synchronization control for Apollo downlink telemetry. The basic objective was to determine the effects of varying the switch-controlled error tolerance thresholds of two types of existing operational equipment. Criteria for setting these error tolerance switches are presented. The criteria are established to control the average time spent in the acquisition and lock modes of the data decommutation process. Any choice of switch settings would be dependent upon the data quality and quantity requirements of a particular mission. Examples of switch setting criteria are given which depend upon 'maximum acceptable' bit error rates based on assumed operational requirements. (Author)
AD-656 890 HC$3.00 MF$0.65

PERFORMANCE OF THE SUPPORT SYSTEMS ABOARD THE DME-A SATELLITE, 29 NOV. 1965-FEB. 1967.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 22B.
AD-657 156 HC$3.00 MF$0.65

OPTIMUM FREQUENCY MODULATION RECEIVERS.
Polytechnic Inst. of Brooklyn, N. Y. Dept. of Electrical Engineering.
A. Guida, and D. L. Schilling. 1967, 28p NASA-CR-87056, T-3
Contract NGR-33-006-020

Descriptors: *Frequency modulation, *Gaussian noise, *Optimization, *Receiver, Analog, Carrier, Frequency, Maximum, Modulation, Noise, Ratio, Signal, Spike.

For abstract, see STAR 05 19.
N67-32715 HC$3.00 MF$0.65

PCM TELEMETRY DATA COMPRESSION STUDY, PHASE II QUARTERLY REPORT, 25 NOV. 1965 - 25 FEB. 1966.
Lockheed Missiles and Space Co., Sunnyvale, Calif.
W. R. Bechtold, T. Bjorn, Jr., and J. E. Medlin.
Apr 66, 91p NASA-CR-86993, LMSC-M-62-66-2
Contract NAS5-9729

Descriptors: *Computer simulation, *Data compressor, *Ogo-a, *Pulse code modulation (pcm), *Telemetry, Analysis, Code, Compression, Compressor, Computer, Data, Link, Model, Modulation, Pcm, Program, Pulse, Queueing, Simulation.

For abstract, see STAR 05 19.
N67-33013 HC$3.00 MF$0.65

COMMAND PROCESSORS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
D. E. Jamison. Aug 67, 33p NASA-TN-D-4086
Contract 841-11-78-01-51

Descriptors: *Command control, *Decoder, *Ground support equipment, *Satellite control, Command, Communication, Control, Equipment, Ground, Pcm, Satellite, Support, System, Telemetry.

For abstract, see STAR 05 19.
N67-33039 HC$3.00 MF$0.65

POSITION LOCATION AND AIRCRAFT COMMUNICATION EQUIPMENT (PLACE).
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
W. K. Allen, E. Hirschmann, R. C. Hollenbaugh, and C. R. Laughlin. Apr 67, 130p NASA-TM-X-55862, X-731-67-159

Descriptors: *Aircraft communication, *Ground control, *Position indicator, *Synchronous satellite, *Transponder, Aircraft, Applications technology satellite (ats), Communication, Data, Indicator, Inertial, L-band, Location, Navigation, Performance, Position, Satellite, Synchronous, Two, Voice, Way.

For abstract, see STAR 05 19.
N67-33199 HC$3.00 MF$0.65

STUDY OF NONSTATIONARY RANDOM PROCESS THEORY FINAL REPORT, 1 JUL. 1966 - 30 APR. 1967.
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
J. R. Knight, and W. W. Wierwille. Jun 67, 63p NASA-CR-87289, CAL-XM-1970-B-3
Contract NAS8-11346

Descriptors: *Random process, *Signal analysis, *Spectral analysis, Analysis, Application, Computer, Correlation, Digital, Error, Estimation, Feasibility, Function, Method, Nonstationary, Plotting, Program, Routine, Signal, Test, Time.

For abstract, see STAR 05 19.
N67-33262 HC$3.00 MF$0.65

AN EFFICIENT CODING SYSTEM FOR DEEP SPACE PROBES WITH SPECIFIC APPLICATION TO PIONEER MISSIONS.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
For primary bibliographic entry see Field 9D.
For abstract, see STAR 05 19.
N67-33270 HC$3.00 MF$0.65

PSK SUBCARRIER DEMODULATORS FOR DATA ACQUISITION.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
V. J. Di Losa, T. V. Saliga, and V. R. Simas. Apr 67, 15p NASA-TM-X-55866, X-523-67-214

Descriptors: *Data acquisition, *Demodulator, *Phase-shift keying, *Pulse code modulation (pcm), Acquisition, Code, Coherent, Conditioner, Cost, Data, Demodulation, Digital, Error, Filter, Keying, Low, Method, Modulation, Noise, Performance, Phase, Pulse, Rate, Reduction, Regeneration, Shift, Signal, Subcarrier, Tracking, Transmission.

For abstract, see STAR 05 19.
N67-33407 HC$3.00 MF$0.65

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

PRESENT STATUS OF LITHIUM DIFFUSED SILICON SOLAR CELLS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
P. H. Fang. Mar 67, 65p NASA-TM-X-55860, X-713-67-136

Descriptors: *Semiconductor device, *Solar cell, Cell, Damage, Device, Effect, Lithium, Radiation, Semiconductor, Silicon, Solar.

For abstract, see STAR 05 19.
N67-33012 HC$3.00 MF$0.65

10B. Power Sources

RADIATION DAMAGE TO ORBITING SOLAR CELLS AND TRANSISTORS.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
R. E. Fischell, J. H. Martin, W. E. Radford, and W. E. Allen. Mar 67, 33p Rept no. TG-886
Contract NOw-62-0604

Descriptors: (*Solar cells, Radiation damage), (*Transistors, Radiation damage), Space environmental conditions, Experimental data, Scientific satellites, Performance (Engineering).

In-flight solar cell degradation studies began with the launching of the 1961-01 satellite on June 29, 1961. Similar experiments were flown on the 1961-alpha eta and 1961-alpha eta 2 satellites. Data obtained from these satellites cover a time period both before and after Operation Starfish on July 9, 1962. Subsequently solar cell and electronic experiments were flown on satellites 1962-beta eta, ANNA 1-B, 1963-38C, and 1964-83C. The data indicate that the damage to solar cells in a 1000 km orbit during the early months after Operation Starfish may not have been mostly a result of fission spectrum electrons. Although many energetic electrons were introduced into the inner belt, it is indicated that some high energy (>4.5 mev) protons were redistributed to altitudes including 1000 km. The results of flight experiments indicate that optimum power-to-weight ratio solar arrays will be obtained by use of N-on-P solar cells with 6 mil glass covers. (Author)
AD-657 155 HC$3.00 MF$0.65

PERFORMANCE OF THE SUPPORT SYSTEMS ABOARD THE DME-A SATELLITE, 29 NOV. 1965-FEB. 1967.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 22B.
AD-657 156 HC$3.00 MF$0.65

STUDY OF NUCLEAR SEEDED MHD PLASMAS.
Florida Univ Gainesville Dept of Nuclear Engineering Sciences
For primary bibliographic entry see Field 20I.
AD-657 199 HC$3.00 MF$0.65

REDUCTION OF THE CARBON-HYDROGEN BOND STRENGTH IN METHANOL ADSORBED ON PLATINUM FUEL-CELL ELECTRODES.
Naval Ship Research and Development Center Annapolis Md Annapolis Div
R. E. Smith, H. B. Urbach, and N. L. Hatfield.
Aug 67, 17p
NSRDC-104/67

Descriptors: (*Fuel cells, Electrodes), (*Electrodes, Sorption), (*Methanols, Decomposition), Electrochemistry, Tracer studies, Chemical

bonds, Dehydrogenation, Exchange reactions, Dissociation, Catalysis.

Radiometric evidence of a reduction in hydrogen-carbon bond strengths in the methanol molecule when electrosorbed on platinum-black electrodes was obtained in a study of sorption processes at fuel-cell electrodes. In an aqueous solution of methanol, the 3H radioactivity level was found to remain constant while the 14C radioactivity in the fuel-electrolyte solution indicated substantial adsorption had occurred on the platinum electrode. This anomalous result may be explained by the rapid dehydrogenation and/or exchange of carbon-bonded hydrogen with water when the methanol is adsorbed. The existence of these mechanisms lends support to the dissociative theories of electrosorption and explains, in part, the activation of hydrocarbons undergoing anodic oxidation. (Author)
AD-657 453 HC$3.00 MF$0.65

GERMANIUM SOLAR CELLS.
Photopiles Solaires Au Germanium
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
E. Le Grives, P. Sebillot, and J. Tavernier. 1967, 49p ONERA-TP-478/1967/
in French, English Summary Presented At the Agard Meeting on Prediction of Performances of Some Static Energy Conversion Devices, Liege, 12-16 Jun. 1967

Descriptors: *Energy conversion efficiency, *Germanium, *Solar cell, *Thermo-photovoltaic conversion, Auxiliary, Cell, Conversion, Converter, Diode, Efficiency, Energy, Photovoltaic, Power, Radiation, Silicon, Solar, Source.

For abstract, see STAR 05 19.
N67-33332 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

11. MATERIALS

11A. Adhesives and Seals

THE DEVELOPMENT OF STRUCTURAL ADHESIVE SYSTEMS SUITABLE FOR USE WITH LIQUID OXYGEN SUMMARY REPORT IV, 1 JUL. -30 NOV. 1966.
Narmco Industries, Inc., San Diego, Calif.
R. M. De Borde, E. S. Harrison, J. Hollander, B. Y. Sanders, and F. D. Trischler. Jan 67, 74p NASA-CR-87156
Contract NAS8-11068

Descriptors: *Adhesive, *Liquid oxygen (lox), *Polyurethane, Benzene, Bonding, Compatibility, Diamine, Diol, Fluorination, Isocyanate, Lap, Liquid, Methylene, Oxide, Oxygen, Pentane, Polyether, Preparation, Propylene, Shear, Specimen, Structural, System, Test.

For abstract, see STAR 05 19.
N67-33272 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

11B. Ceramics, Refractories, and Glasses

DEVELOPMENT OF HIGH TEMPERATURE THERMAL CONDUCTIVITY STANDARDS,
Little (Arthur D) Inc Cambridge Mass
For primary bibliographic entry see Field 20M.
AD-657 024 HC$3.00 MF$0.65

A STANDING-WAVE METHOD FOR THE MICROWAVE EVALUATION OF DIELECTRIC AND MAGNETIC MATERIALS.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 14B.
AD-657 055 HC$3.00 MF$0.65

MEASUREMENT OF THE DISSIPATION ASSOCIATED WITH THE ELECTROMECHANICAL COUPLING IN PIEZOELECTRIC CERAMICS.
Doctoral thesis,
Navy Underwater Sound Lab New London Conn
Ralph S. Woollett. 12 Jul 67, 143p Rept no. USL-834

Descriptors: (*Ceramic materials, Piezoelectric crystals), (*Piezoelectric transducers, Sonar equipment), Measurement, Vibration, Barium compounds, Titanates, Lead compounds, Zirconates, Rods, Dissipation factor, Interferometers, Lasers.

An investigation was made to develop methods for precise measurements of velocity or displacement (including their phase angles as well as their magnitudes) and to apply these methods to extend the knowledge of the dissipative parameters of piezoelectric ceramics. Laser interferometry is a very promising new method for measuring small vibrations. In this method the motion of a small mirror attached to the vibrating body phase-modulates the light beam, and the light beam is subsequently demodulated by a photomultiplier tube. An electronic control system was developed to stabilize the interferometer against low-frequency building vibrations. In this system the mirror of the interferometer that is normally fixed is mounted on a small piezoelectric transducer. This transducer is driven by a servo amplifier in such a manner that it keeps the path length of the interfering beams constant at low frequencies. Building vibrations thus are canceled out, but the control system becomes inoperative above 1 kHz and, hence, does not interfere with the measurement of the desired vibration signals, which are in this upper frequency range. Another feedback control system was developed to stabilize the amplitude of the laser output, which was found to fluctuate as much as 10 percent. These fluctuations were reduced to about 1 percent. After suitable measurement methods had been developed, measurements were made of the electromechanical transfer ratios of a number of ceramic samples. (Author)
AD-657 169 HC$3.00 MF$0.65

PYROLYTIC CARBIDE DEVELOPMENT PROGRAM.
Monthly progress rept. no. 2, 15 Apr-31 May 60.
High Temperature Materials Inc Boston Mass
31 May 60, 7p
Contract NOw-60-0292
See also AD-235 223 (PB-163 936).

Descriptors: (*Rocket motor nozzles, Refractory materials), (*Carbides, Preparation), (*Silicon carbide, Vapor plating), Silicon compounds, Chlorides, Hydrocarbons, Vapors, Deposition, Injectors, Stability, Instrumentation.

The progress of a program aimed at the development of pyrolytic carbide for rocket nozzle applications is reported. The effort involved, for the most part, the deposition of silicon carbide from silicon tetrachloride-hydrocarbon vapors. Work was also undertaken on process equipment and instrumentation design.
AD-657 188 HC$3.00 MF$0.65

PYROLYTIC CARBIDE DEVELOPMENT PROGRAM.
Monthly progress rept. no. 3, 1 Jun-30 Jun 60.
High Temperature Materials Inc Boston Mass
30 Jun 60, 6p
Contract NOw-60-0292
See also AD-657 188.

Descriptors: (*Rocket motor nozzles, Refractory materials), (*Carbides, Preparation), (*Silicon carbides, Vapor plating), Silicon compounds, Chlorides, Methane, Vapors, Deposition, Injectors, Instrumentation.

The progress of a program aimed at the development of pyrolytic carbide for rocket nozzle applications is reported. The effort involved, for the most part, the deposition of silicon carbide from silicon tetrachloride-methane vapors. Work was also undertaken on process equipment and instrumentation design.
AD-657 189 HC$3.00 MF$0.65

METHODS OF REDUCING THE SIZE AND NUMBER OF VOIDS ON FORMED CONCRETE SURFACES.
Army Engineer Waterways Experiment Station Vicksburg Miss
For primary bibliographic entry see Field 13M.
AD-657 215 MF$0.65

MATERIALS PREPARATION AND CHARACTERIZATION RESEARCH.
Pennsylvania State Univ University Park Materials Research Lab
For primary bibliographic entry see Field 20L.
AD-657 237 HC$3.00 MF$0.65

APPLICATION OF HIGH-TEMPERATURE SOLUTION CALORIMETRY TO OXIDE SYSTEMS,
Chicago Univ Ill Dept of Chemistry
O. J. Kleppa. 1967, 10p
AROD-5107:6
Grant DA-ARO (D)-31-124-G616
Availability: Published in Proceedings of the British Ceramic Society n8 p31-8 Jun 1967.

Descriptors: (*Oxides, *Calorimetry), (*Ceramic materials, Calorimetry), Thermochemistry, Alumina, Corundum, Phase studies, Enthalpy, Magnesium compounds, Aluminates, Spinels, Heat of formation, Aluminum compounds, Silicates, Reviews.
Identifiers: Aluminum silicates, Magnesium aluminate.

Group 11B—Ceramics, refractories, and glasses

A brief review is given of the application of solution calorimetry to oxide systems at high temperature. This approach permits detailed thermochemical investigation of some problems which have defied attack by room-temperature calorimetric methods. Among the problems that have been studied are: (1) the enthalpies of transformation of metastable aluminas to the stable corundum modification, (2) the enthalpy of formation of $MgAl_2O_4$ spinel, (3) the enthalpy of formation of the Al silicates. (Author)
AD-657 268 Not available from CFSTI.

PREPARATION OF DENSE ABLATIVE COMPACTS.
Naval Ordnance Test Station China Lake Calif
For primary bibliographic entry see Field 11G.
AD-657 308 HC$3.00 MF$0.65

FRITTING OF REFRACTORY MATERIALS.
Frittage de Materiaux Refractaires
National Aeronautics and Space Administration, Washington, D. C.
A. Hivert. Aug 67, 3p NASA-TT-F-11174
Transl. Into English From the French Presented At the Sci. Sessions of Onera, Chatillon-sous-bagneux, 23-25 Jun. 1966

Descriptors: *Mechanical property, *Metal carbide, *Refractory material, *Tensile testing machine, Carbide, Copper, Frit, High temperature, Infiltration, Machine, Material, Mechanical, Metal, Porosity, Property, Refractory, Silver, Sintering, Tantalum, Tensile, Testing, Titanium, Zirconium.

For abstract, see STAR 05 19.
N67-33287 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

11C. Coating, Colorants, and Finishes

COLD PRESSING AND SINTERING OF RARE EARTH OXIDES,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
H. I. Fullam, and L. J. Kirby. Apr 67, 28p
Contract AT (45-1)-1830

Descriptors: (*Rare earths, Processing), Sintering, Samarium compounds, Oxides, Mechanical working, Material forming.
Identifiers: Samarium oxide.

For abstract, see NSA 21 16.
BNWL-386 HC$3.00 MF$0.65

INVESTIGATION OF STERILIZABLE COMPOUNDS FOR EMBEDMENT OR CONFORMAL COATING.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
M. W. Hanchette. Feb 67, 12p NASA-TM-X-55710, X-623-67-79

Descriptors: *Polymer, *Protective coating, *Sterilization, Baking, Circuit, Coating, Compound, Conformal, Curing, Embedding, Encapsulation, Print, Protection, Thermal.

For abstract, see STAR 05 19.
N67-33969 HC$3.00 MF$0.65

11D. Composite Materials

THE BRITTLE STRENGTH OF ORTHOTROPIC MATERIALS,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
For primary bibliographic entry see Field 20K.
AD-657 078 Not available from CFSTI.

SURFACES AND INTERFACES IN MATERIALS TECHNOLOGY.
Martin Co Baltimore Md Research Inst for Advanced Studies
For primary bibliographic entry see Field 11G.
AD-657 380 HC$3.00 MF$0.65

DISPERSION OF FREE HARMONIC WAVES IN FIBER-REINFORCED COMPOSITES.
Northwestern Univ Evanston Ill Structural Mechanics Lab
For primary bibliographic entry see Field 20N.
AD-657 461 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

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PB-175 400 HC$450.00 MF$150.00

11E. Fibers and Textiles

DISPERSION OF FREE HARMONIC WAVES IN FIBER-REINFORCED COMPOSITES.
Northwestern Univ Evanston Ill Structural Mechanics Lab
For primary bibliographic entry see Field 20N.
AD-657 461 HC$3.00 MF$0.65

11F. Metallurgy and Metallography

ALLOTROPIC TRANSFORMATIONS IN CERIUM,
Illinois Univ Urbana
M. S. Rashid, and C. J. Altstetter. 28 Mar 66, 11p

AROD-4953:1-MC
Contract DA-31-124-ARO (D)-297
Availability: Published in Transactions of the Metallurgical Society of AIME v236 p1649-56 Dec 1966.

Descriptors: (*Cerium, Phase studies), Grain structures (Metallurgy), Crystal structure, Thermal expansion, Resistance (Electrical), X-ray diffraction analysis, Metallography.
Identifiers: Allotropy.

Allotropic transformations in cerium were studied by dilatometric, resistometric, X-ray diffraction, and metallographic techniques. The dilatometric study indicated that, on cooling below 0C, the high-temperature fcc phase, gamma, transforms partly to the hexagonal phase, beta, and, on further cooling, to the collapsed fcc phase, alpha. The amount of beta phase present at room temperature is increased by repeated cycling through the alpha-gamma transformation. It is shown metallographically that the gamma-beta transformation has many characteristics of a martensitic transformation. In contrast to the gamma-beta transformation the gamma-alpha transformation does not give the manifestation of a shear transformation. Small cellular gamma domains of random shape and size collapse to alpha in a short time with no apparent coordination with neighboring domains. The considerable confusion in the literature over the existence of more than one high-temperature fcc phase is discussed. Two such phases have been reported in the literature and an attempt is made in this study to clarify the situation. Twelve fcc and two hcp structures are shown to be easily reproduced or eliminated. It is proposed that the two 'additional' allotropes reported in the literature and fourteen of the phases detected here are not allotropes of cerium but are due to contamination. (Author)
AD-656 798 Not available from CFSTI.

PROCEEDINGS OF THE SYMPOSIUM ON THE STRUCTURE OF SURFACES, ARMY RESEARCH OFFICE, DURHAM, NORTH CAROLINA, 8-9 NOVEMBER 1966,
Army Research Office Durham N C
For primary bibliographic entry see Field 20B.
AD-656 874 Not available from CFSTI.

CORROSION STUDIES OF HAYNES 25 ALLOY IN SEAWATER USING ELECTROCHEMICAL TECHNIQUES,
Naval Radiological Defense Lab San Francisco Calif
Donald A. Kubose, and Herman I. Cordova. 22 Aug 67, 31p Rept no. USNRDL-TR-67-64
Contract AT (49-5)-2084

Descriptors: (*Reactor materials, Corrosion), (*Cobalt alloys, Corrosion), (*Corrosion, *Sea water), Chromium alloys, Tungsten alloys, Nickel alloys, Iron alloys, Manganese alloys, Electrochemistry, Oxidation-reduction reactions, Coatings, Thermal shock, Reaction kinetics, Power reactors, Spaceborne, Atmosphere entry, Water entry, Hazards.
Identifiers: SNAP, Haynes alloy 25.

Electrochemical corrosion rate measurements were made on uncoated, emissively coated and thermally shocked and uncoated specimens of Haynes 25 alloy in seawater at room temperature and 90C. The corrosion rates of the emissively coated specimens were about an order of magnitude higher than those of the uncoated specimens. No significant difference between the corrosion rates measured at room temperature and at 90C was observed for either the uncoated or the emissively coated specimens. Thermal shocking of uncoated specimens (by quenching from 500C to room temperature) did not increase their corrosion rates. The corrosion rates observed were on the order of 0.003 mils per year (mpy) for the uncoated and the thermally shocked uncoated specimens and 0.04 mpy for the emissively coated specimens. (Author)
AD-656 897 HC$3.00 MF$0.65

MARINE CORROSION STUDIES: THE ELECTROCHEMICAL CHARACTERISTICS OF SEVERAL PROPRIETARY LUMINUM GALVANICANODE MATERIALS IN SEA WATER.

Interim rept. no. 5,
Naval Research Lab Washington D C
T. J. Lennox, Jr., M. H. Peterson, and R. E. Groover. May 67, 43p Rept no. NRL-MR-1792
See also AD-639 599.

Descriptors: (*Corrosion, *Sea water), (*Aluminum alloys, Electrochemistry), (*Cathodic protection, Anodes), Zinc alloys, Electrodes, Materials, Acceptability, Oxidation-reduction reactions, Environmental tests, Efficiency.

A series of experiments is described which was designed to obtain the electrochemical efficiency, electrochemical potential, and current output versus time data for five proprietary aluminum alloys using full-size anodes in sea water under conditions which approach those encountered in service. High and dependable electrochemical efficiency, sustained current output versus time characteristics, and elimination of inherently high resistance between cast-in steel cores and the anode metal must be realized before aluminum anodes can be considered for general Navy use.
AD-656 899 HC$3.00 MF$0.65

DEVELOPMENT OF HIGH TEMPERATURE THERMAL CONDUCTIVITY STANDARDS,
Little (Arthur D) Inc Cambridge Mass
For primary bibliographic entry see Field 20M.
AD-657 024 HC$3.00 MF$0.65

CRYSTAL GROWTH STUDIES OF THE ALKALI METALS, THE RARE EARTHS, AND COBALT.
Virginia Inst for Scientific Research Richmond
For primary bibliographic entry see Field 20B.
AD-657 053 HC$3.00 MF$0.65

ADSORPTION ON NIOBIUM (110), TANTALUM (110), AND VANADIUM (110) SURFACES,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7D.
AD-657 064 Not available from CFSTI.

STRUCTURAL EFFICIENCY OF VARIOUS MATERIALS AT ELEVATED TEMPERATURES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
W. C. Caywood, and R. M. Rivello. Oct 56, 14p Rept no. CF-2578
Contract NOrd-7386

Descriptors: (*Aluminum, Structural properties), (*Steel, Structural properties), (*Nickel alloys, Structural properties), (*Magnesium alloys, Structural properties), (*Titanium alloys, Structural properties), Stainless steel, Tensile properties, Bending, Cylindrical bodies, Loading (Mechanics), Buckling (Mechanics), Graphics, Efficiency, High-temperature research, Metal plates.

Curves are presented for determining the relative efficiencies of several structural materials at elevated temperatures for various loading conditions. The materials considered are: Aluminum - 6061-T6, 2024-T4; Steel - NAX (high strength low alloy steel made by Great Lakes Steel Corp.); Stainless Steel - 301 1/2H, 321 Annealed, 17-7PH Condition TH1050, 17-7PH Condition RH950; High Nickel Alloy - Inconel X Solution treated; Magnesium - HK31A-T6, HM21XA-T8; Titanium -6AL-4V.
AD-657 110 HC$3.00 MF$0.65

CALIBRATION AND USE OF AN ELECTRON MICROSCOPE FOR PRECISION MICROMEASUREMENTS IN THIN FILM MATERIALS,
Pennsylvania State Univ University Park Materials Research Lab
For primary bibliographic entry see Field 20L.
AD-657 243 Not available from CFSTI.

THE EMBRITTLEMENT OF COPPER-17 ATOMIC % ALUMINUM ALLOY BY LIQUID MERCURY.
Technical rept.,
Mcmaster Univ Hamilton (Ontario) Dept of Metallurgy and Metallurgical Engineering
M. B. Ives, and P. C. Hancock. Aug 67, 119p Rept no. TR-9
Contract Nonr-3925 (00)

Descriptors: (*Embrittlement, *Liquid metals), (*Copper alloys, Embrittlement), Deformation, Cracks, Stresses, Fracture (Mechanics), Mercury, Hardening, Plasticity, Microstructure, Grain structures (Metallurgy), Aluminum alloys.
Identifiers: Copper alloy 17Al.

The role of plastic deformation in the initiation and propagation of cracks in Cu-17Al alloy embrittled by liquid mercury has been studied. It is proposed that extensive plastic deformation and work hardening must occur at the crack-tip during propagation in order to raise the local flow stress to a critical level at which the maximum normal stress is equal to the cohesive strength. Strong indication is given that a 'critical applied stress' criterion for fracture is not applicable for this material. Microcracks are formed at weakened grain boundaries and a period of stable crack growth made over a period of increasing applied stress may be necessary before the crack is long enough to become unstable. (Author)
AD-657 379 HC$3.00 MF$0.65

SURFACES AND INTERFACES IN MATERIALS TECHNOLOGY.
Martin Co Baltimore Md Research Inst for Advanced Studies
For primary bibliographic entry see Field 11G.
AD-657 380 HC$3.00 MF$0.65

STRAIN-INDUCED PHASE TRANSFORMATION IN METASTABLE CU-SI SOLID SOLUTIONS.
Technical rept.,
Washington Univ Seattle Coll of Engineering
M. B. Kasen, R. Taggart, and D. H. Polonis. Aug 67, 9p Rept no. TR-4
Contract Nonr-477 (40)
Availability: Published in Transactions Quarterly American Society for Metals, v60 n2 p144-51 Jun 1967.

Descriptors: (*Copper alloys, Silicon alloys), (*Phase studies, Copper alloys), Solid solutions, Microstructure, Strain (Mechanics), Transformations, Deformation, Grain structures (Metallurgy).

The strain-induced fcc yields hcp phase transformation in metastable Cu-Si alloys has been studied over the temperature range from 20 to 450 C. Continuous monitoring of the microstructure during deformation has shown that the formation of a hcp phase precedes the appearance of slip lines. The strain energy required to activate the transformation increases up to 300 C and undergoes a reversal at higher temperatures. A model based on the nucleation of plates of a hcp phase (designated K sub epsilon) from bundles of stacking faults that emanate from the alpha-grain boundaries has been proposed to account for the initiation of transformation. The low yield stress that is typical of this system is explainable on the basis of the same model. The high strain hardening rate of the metastable alpha phase has been identified with the slip barriers established by the hcp plates formed during the early stages of deformation. (Author)
AD-657 498 Not available from CFSTI.

HYDROGEN EMBRITTLEMENT IN IRRADIATED STEELS,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18J.
For abstract, see NSA 21 16.
ANL-7266 HC$3.00 MF$0.65

HIGH-TEMPERATURE LIQUID-METAL TECHNOLOGY REVIEW. A BIMONTHLY TECHNICAL PROGRESS REVIEW.
Brookhaven National Lab., Upton, N. Y.
For primary bibliographic entry see Field 20M.
For abstract, see NSA 21 16.
BNL-50048 HC$3.00 MF$0.65

IRRADIATION PROPERTIES OF HIGH ENERGY RATE PNEUMATICALLY IMPACTED UO2-PUO2 FUELS,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18J.
For abstract, see NSA 21 16.
BNWL-356 HC$3.00 MF$0.65

MAGNETIC FORCE WELDING APPLICATIONS AT BATTELLE NORTHWEST,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 13H.
For abstract, see NSA 21 16.
BNWL-422 HC$3.00 MF$0.65

PERFORMANCE OF TYPES 304, 316, AND 348 STAINLESS STEEL IN NAK AT HIGH TEMPERATURES,
Idaho Nuclear Corp., Idaho Falls.
T. L. Hoffman. May 67, 11p
Contract AT (10-1)-1230

Descriptors: (*Stainless steel, Performance (Engineering)), (*Corrosion, High-temperature research).

For abstract, see NSA 21 16.
IN-1089 HC$3.00 MF$0.65

EVALUATION OF THE EFFECT OF COLD WORK ON DISPERSION-STRENGTHENED NICKEL-BASE ALLOYS SUMMARY REPORT, 13 JUN. - 13 DEC. 1966.
Teledyne Materials Research Co., Waltham, Mass.
R. C. Nelson, and R. Widmer. Apr 67, 54p
NASA-CR-72240
Contract NAS3-7265

Descriptors: *Cold working, *Dispersion hardening, *Nickel alloy, *Thorium oxide, Alloy, Chromium, Dioxide, Dispersion, Hardening, Nickel, Oxide, Strength, Tensile, Thorium.

For abstract, see STAR 05 19.
N67-32816 HC$3.00 MF$0.65

IN-PILE CORROSION OF NUCLEAR MATERIALS QUARTERLY REPORT, JUN. 1 - AUG. 31 1966.
Centre D Etude de L Energie Nucleaire, Mol (Belgium).
31 Aug 66, 35p EURAEC-1784, EUR-3326
Contract EURATOM-055-65-3 TEEB/RD/

Descriptors: *Electrochemical corrosion, *Platinum, *Radiolysis, *Steel, Acid, Chloride, Cobalt, Corrosion, Electrochemical, Electrochemistry, Electrode, Ferric, Ferrous, Gamma, Hydrogen, Impurity, Ion, Irradiation, Material, Nuclear, Organic, Solution, Source, Water.

For abstract, see STAR 05 19.
N67-33014 HC$3.00 MF$0.65

CORROSION IN THE PRESENCE OF A COMPLEXING AGENT APPLICATION TO THE CONTINUOUS DETERMINATION OF HYDROFLUORIC ACID IN THE ATMOSPHERE.
Corrosion en Presence de Complexant Application A La Determination en Continu de L Acide Fluorhydrique Dans l'Atmosphere
Commissariat A L Energie Atomique, Fontenay-

Aux-roses (France). Centre D'etudes Nucleaires.
Y. Chapron. Oct 66, 108p CEA-R-3031
in French, English Summary

Descriptors: *Aluminum, *Electrochemical corrosion, *Fluoride, *Hydrofluoric acid, *Oxidation resistance, Acid, Agent, Atmosphere, Complex, Corrosion, Electrochemical, Electrode, Hydrofluoric, Kinetics, Oxidation, Resistance, Thermodynamics.

For abstract, see STAR 05 19.
N67-33160 HC$3.00 MF$0.65

NIOBIUM CORROSION FLOWING LIQUID SODIUM BETWEEN 400 AND 600 DEG C.
Corrosion Du Niobium Par le Sodium Liquide en Circulation Entre 400 Et 600 Deg C
Commissariat A L Energie Atomique, Saclay (France). Centre D'etudes Nucleaires.
L. Champeix, R. Darras, W. Graff, and J. Sannier. Oct 66, 31p CEA-R-3028
in French, English Summary

Descriptors: *Liquid sodium, *Metal corrosion, *Niobium, Alloy, Corrosion, Flow, Liquid, Metal, Neutron, Oxidation, Purity, Rate, Reactor, Simulation, Sodium, Temperature.

For abstract, see STAR 05 19.
N67-33212 HC$3.00 MF$0.65

CONTRIBUTION TO THE STUDY OF THE SINTERING OF EX-CARBONYL IRON IN THE ALPHA AND GAMMA PHASES USING THE MICROFRACTOGRAPHICAL TECHNIQUE.
Contribution A l'Etude Du Frittage Du Fer Ex-carbonyle en Phase Alpha Et Gamma Par Examen des Surfaces de Rupture Au Microscope Electronique
Commissariat A L Energie Atomique, Saclay (France). Centre D'etudes Nucleaires.
M.-T. Oxley. 1966, 57p CEA-R-2996
in French, English Summary

Descriptors: *Electron microscopy, *Iron, *Micrography, *Sintering, *Solid phase, Alpha, Carbonyl, Electron, Gamma, Metallurgy, Microscopy, Phase, Powder, Solid.

For abstract, see STAR 05 19.
N67-33260 HC$3.00 MF$0.65

DIFFUSION ALONG AND AROUND DISLOCATIONS.
Commissariat A L Energie Atomique, Saclay (France). Centre D'etudes Nucleaires.
For primary bibliographic entry see Field 20B.
For abstract, see STAR 05 19.
N67-33285 HC$3.00 MF$0.65

ON THE INTERACTIONS BETWEEN CARBON MONOXIDE AND TRANSITION METALS.
Commissariat A L Energie Atomique, Saclay (France). Centre D'etudes Nucleaires.
For primary bibliographic entry see Field 7D.
For abstract, see STAR 05 19.
N67-33495 HC$3.00 MF$0.65

PERCENTAGE DETERMINATION OF OXYGEN, NITROGEN, CARBON AND SILICIUM IN REFRACTORY METALS AND THEIR ALLOYS BY EMISSION SPECTROMETRY IN THE FAR U.V. SPECTRUM.
Dosage des Elements Oxygene, Azote, Carbone Et Silicium Dans les Metaux Refractaires Et Leurs Alliages, Par Spectrometrie D'emis- Sion Dans l'Ultraviolet Lointain
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
F. Malamand. 1967, 43p ONERA-TN-105/1967/
in French, English Summary

Descriptors: *Emission spectrum, *Far ultraviolet, *Refractory metal, *Spectrometry, Alloy, Carbon, Chemical, Composition, Emission, Far, Ionization, Metal, Molybdenum, Niobium, Nitrogen, Oxygen, Refractory, Silicon, Spectrum, Tantalum, Ultraviolet, Vacuum.

For abstract, see STAR 05 19.
N67-33501 HC$3.00 MF$0.65

STEEL STUDIES QUARTERLY REPORT, 1 JUL. - 30 SEP. 1966.
Chantiers de L Atlantique Saint-nazaire (France).
30 Sep 66, 3p EURAEC-1798, EUR-3338
Contract EURATOM-054-61-12 RDF
Its Quart. Rept.-2.32

Descriptors: *High temperature research, *Metallurgy, *Steel, Alloy, Austenite, Composition, Critical, Curve, Element, Expansion, Grain, Heating, High temperature, Metal, Processing, Rate, Refinement, Relief, Research, Stress, Transformation.

For abstract, see STAR 05 19.
N67-33839 HC$3.00 MF$0.65

STEEL STUDIES QUARTERLY REPORT, JUL. - SEP. 1966.
Compagnie des Ateliers Et Forges de La Loire, Paris (France).
Sep 66, 77p EURAEC-1800, EUR-3340
Contract EURATOM-033-64-9-TEEF (RD)

Descriptors: *Austenitic steel, *Ferrite, *High temperature research, *Metallurgy, Alloy, Austenite, Corrosion, Environment, High temperature, Mechanical, Phase, Property, Research, Steam, Steel, Strength, Stress, Structure, Tensile, Test, Vapor, Water, Wire.

For abstract, see STAR 05 19.
N67-33933 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
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PB-175 400 HC$450.00 MF$150.00

ANNUAL PROGRESS SUMMARY (ON URANIUM FABRICATION), 1966.
Reactive Metals, Inc., Ashtabula, Ohio.
For primary bibliographic entry see Field 18J.
For abstract, see NSA 21 16.
RMI-8 HC$3.00 MF$0.65

DYNAMIC BEHAVIOR OF BERYLLIUM,
Sandia Corp., Albuquerque, N. Mex.
D. E. Munson. Jun 67, 10p

Descriptors: (*Beryllium, Metal plates), (*Sheets, Impact), Stresses, Strain (Mechanics), Elasticity, Plasticity.

For abstract, see NSA 21 16.
SC-RR-67-368 HC$3.00 MF$0.65

11G. Miscellaneous Materials

A STANDING-WAVE METHOD FOR THE MICROWAVE EVALUATION OF DIELECTRIC AND MAGNETIC MATERIALS.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 14B.
AD-657 055 HC$3.00 MF$0.65

ENCYCLOPEDIA OF CONTEMPORARY ENGINEERING. STRUCTURAL MATERIALS. PART I. ABLATION THRU CORDS.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 13C.
AD-657 256 HC$3.00 MF$0.65

ENCYCLOPEDIA OF CONTEMPORARY ENGINEERING. STRUCTURAL MATERIALS. PART II. CORROSION FATIGUE THRU HASTELLOY.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 13C.
AD-657 257 HC$3.00 MF$0.65

ENCYCLOPEDIA OF CONTEMPORARY ENGINEERING. STRUCTURAL MATERIALS. PART III. HEAT AND SOUND INSULATING LOOSE FIBER MATERIALS THRU NICHROME.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 13C.
AD-657 258 HC$3.00 MF$0.65

ENCYCLOPEDIA OF CONTEMPORARY ENGINEERING. STRUCTURAL MATERIALS. PART IV. NICKEL THRU SOFT MAGNETIC MATERIALS.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 13C.
AD-657 259 HC$3.00 MF$0.65

ENCYCLOPEDIA OF CONTEMPORARY ENGINEERING. STRUCTURAL MATERIALS. PART V. SOLDER THRU ZIRCON.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 13C.
AD-657 260 HC$3.00 MF$0.65

PREPARATION OF DENSE ABLATIVE COMPACTS.
Research rept.,
Naval Ordnance Test Station China Lake Calif
C. A. Hering, and W. S. McEwan. Jun 67, 15p
Rept no. NOTS-TP-4376

Descriptors: (*Heat shields, Materials), (*Tungsten, *Ablation), Powder metals, Porous materials, Ceramic materials, Calcium oxides, Calcium compounds, Carbonates, Cermets, Compacting, Sintering, Bonding, Thermal properties, Mechanical properties.
Identifiers: Ablative materials, Calcium carbonate.

Attempts were made to fabricate a dense material that when heated would produce gaseous products and possibly a slag. Structural strength was an added requirement. In preliminary work tungsten was dispersed in a carbonate phase. This system was too weak mechanically to permit any evaluation whatsoever. In further experimentation attempts were made (1) to make tungsten the continuous phase by sintering tungsten powder by passage of an electric current through it, and (2) to make a compact bonded by tungsten compounds. Variations of these ideas were tried with only moderate success. (Author)
AD-657 308 HC$3.00 MF$0.65

SURFACES AND INTERFACES IN MATERIALS TECHNOLOGY.
Technical rept.,
Martin Co Baltimore Md Research Inst for Advanced Studies
A. R. C. Westwood, and R. G. Lye. Aug 67, 97p Rept no. TR-10, RIAS-TR-67-12-C
Contract Nonr-4162 (00)

Descriptors: (*Surface properties, Reviews), (*Interfaces, Reviews), Materials, Composite materials, Environment, Mechanical properties, Electrical properties, Friction, Lubrication, Wear resistance, Adhesion, Welding, Sintering, Coatings, Grain structures (Metallurgy), Porous metals.

Surfaces and interfaces are involved in many aspects of engineering technology. Of particular interest to materials scientists are those aspects in which phenomena occurring at external or internal surfaces determine mechanical behavior, or electronic properties. Factors involved in some of these effects, and in such important surface phenomena as friction, lubrication and wear, sintering, welding and adhesion, are reviewed and briefly discussed. (Author)
AD-657 380 HC$3.00 MF$0.65

RESEARCH ACTIVITIES IN THE FIELD OF MATERIALS SCIENCE.
Technical progress rept. 1 Jul 65-30 Jun 66.
North Carolina Univ Chapel Hill Materials Research Center
30 Jun 66, 42p
Contract SD-100

Descriptors: (*Materials, Scientific research), (*Solid state physics, Reviews), (*Organic compounds, Transport properties), (*Complex compounds, Chemical reactions), Single crystals, Superconductivity, Photochemistry, Crystal lattice defects, Nuclear magnetic resonance, Molecular energy levels, Semiconducting films, Electrochemistry, Spectroscopy, Positrons.

Brief summaries are given of the progress and results of research efforts in the areas of: Mechanical and transport properties of ionic single crystals; transport properties and photochemistry of organic crystals; chemistry of complex compounds; nuclear magnetic resonance; semiconductor physics; electrochemistry and thermochemistry; optical properties of solids and liquids.
AD-657 438 HC$3.00 MF$0.65

EFFECTIVE STIFFNESS THEORY FOR LAMINATED MEDIA.
Northwestern Univ Evanston Ill Structural Mechanics Lab
For primary bibliographic entry see Field 20K.
AD-657 462 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
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PB-175 400 HC$450.00 MF$150.00

11H. Oils, Lubricants, and Hydraulic Fluids

SUBSTITUTED BIPHENYLS AND TERPHENYLS AS OXIDATIVELY AUTOINHIBITIVE COMPOUNDS.
Revised ed.,
Frankford Arsenal Philadelphia Pa Pitman-Dunn Research Labs
Helen E. Mertwoy, and Henry Gisser. 1 Feb 67, 8p
FA-A67-8
Revision of manuscript received 18 Oct 66.
Availability: Published in I+EC Product Research and Development v6 p108-12 jun 1967.

Descriptors: (*Polycyclic compounds, *Antioxidants), (*Lubricant additives, Antioxidants), Aromatic compounds, Oxidation, Inhibition, Phenyl ethers, Reaction kinetics, Stability, Lubricants.
Identifiers: Biphenyls, Terphenyls.

In a study of oxidatively autoinhibitive biphenyls and terphenyls, sec-butylbenzenes having phenyl, methoxyphenyl, sec-butylphenyl, or tert-butylphenyl substituted in the ring, either singly or in combination, were prepared, and their autoxidation rates measured at 100C. Whereas sec-butylbenzene oxidized in less than 24 hours, all of the substituted compounds except 4-sec-butyl-4'-tert-butylbiphenyl, were stable for at least 100 hours. The latter compound, however, oxidized at a much slower rate than sec-butylbenzene. The stability of these compounds was attributed to autoinhibition. This is the resultant when the tendency to increase oxidation rate by electron-donating substituents is outweighed by the effectiveness of the inhibitor formed. The inhibitors are presumably hydroxybiphenyls or terphenyls and are a decomposition produce of the hydroperoxide produced via autoxidation at the tertiary carbon. As confirming evidence that inhibitors are formed, it was found that 4-sec-butylbiphenyl and 4-sec-butyl-4'-methoxybiphenyl in mixtures with sec-butylbenzenes exerted a distinct oxidation-inhibiting effect on the latter. Most of the compounds were found to be nonspreading fluids. (Author)
AD-657 084 Not available from CFSTI.

REVIEW OF FAILURE MECHANISMS IN HIGHLY LOADED ROLLING AND SLIDING CONTACTS.
Mechanical Technology Inc Latham N Y
For primary bibliographic entry see Field 13I.
AD-657 337 HC$3.00 MF$0.65

SOME FACTORS AFFECTING THE MOVEMENT OF OIL IN MINIATURE BALL BEARINGS,
Naval Research Lab Washington D C
Curtis R. Singleterry. 12 Jul 67, 19p Rept no. NRL-6555

Descriptors: (*Ball bearings, *Lubrication), (*Oils, Surface properties), Films, Mass transfer, aporation, Molecular association, Gyroscopes.
Identifiers: Surface chemistry.

The transport of oil in films less than one micron thick is controlled largely by surface chemical forces, because the gravitational forces operating on such films are one to three orders of magnitude smaller than the surface forces available. Oils spread largely as a result of capillary forces in scratches or submicroscopic irregularities, and because of surface-tension gradients produced by evaporation of volatile components, by adsorption of surface active components, or by differences in surface temperature. Although centrifugal fields intensify inertial effects until they become a significant factor for oil movement in operating bearings, surface chemical forces remain important in gyro bearings which operate on minimum amounts of oil. Hydrodynamic wedge effects join surface chemical forces in the circulation of oil to and from porous separators. (Author)
AD-657 454 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

11I. Plastics

THE EFFECT OF MOLECULAR WEIGHT ON THE CRYSTALLIZATION AND MELTING OF LONG-CHAIN MOLECULES.
Florida State Univ Tallahassee
For primary bibliographic entry see Field 7D.
AD-656 806 Not available from CFSTI.

SPACE ENVIRONMENTAL EFFECTS ON MATERIALS AND COMPONENTS, VOLUME I. ELASTOMERIC AND PLASTIC MATERIALS. APPENDIX A THROUGH I,
Battelle Memorial Inst Columbus Ohio
N. J. Broadway, R. W. King, and S. Palinchak.
1 Apr 64, 537p
RSIC-150-Vol-1-App-A-I
Contract DA-01-021-AMC-203 (Z)

Descriptors: (*Space environmental conditions, Polymers), (*Plastics, Space environmental conditions), (*Elastomers, Space environmental conditions), Plastic coatings, Adhesives, Electric insulation, Laminated plastics, Embedding substances, Sealing compounds, Seals, O-rings, Gaskets, Vacuum, Thermal properties, Ultraviolet radiation, Nuclear radiation, Cryogenics, Tables, Reviews.

The report presents the results of a literature survey on the effects of vacuum, radiation, and other space environmental parameters on elastomers and plastics intended for use as potting compounds, electric insulation, seals, lubricants, coatings, and structural adhesives. The text, which reviews the state of knowledge of the space environment and its effects on the materials in question, is followed by a series of appendices which presents in tabular and graphic form specific experimental data concerning the behavior of polymeric materials in the environments encountered in space. The basic text and appendices A through I were each previously issued separately as AD-603 364, AD-603 365, AD-603 366, AD-603 367, AD-603 368, AD-603 369, AD-603 370, AD-603 371, AD-603 384, and AD-603 372, respectively. Volume II is available as AD-601 876.
AD-656 925 HC$3.00 MF$0.65

CALCULATION OF THE VOID CONTENT IN GLASS REINFORCED PLASTICS,
Naval Ordnance Lab White Oak Md
Joseph E. Cuevas. 14 Jul 67, 22p Rept no. NOLTR-67-99

Descriptors: (*Reinforced plastics, *Defects (Materials)), Glass, Mathematical analysis, Gravity, Equations, Composite materials, Quality control, Tests, Measurement.

A new approach is proposed for the calculation of voids in glass reinforced plastics. This approach

takes into consideration experimental precision and available knowledge of the specific gravity of the materials used in the fabrication of glass reinforced plastics. Equations based on experimental data have been used as a basis for developing an equation to calculate void content. The technique herein presented gives non-negative void content values even on the more void-free composites. (Author)
AD-657 125 HC$3.00 MF$0.65

CONFORMATION OF POLYSTYRENE ADSORBED ON LIQUID MERCURY,
National Bureau of Standards Washington D C Inst for Materials Research
For primary bibliographic entry see Field 7D.
AD-657 279 Not available from CFSTI.

MECHANICAL BEHAVIOR OF BERYLLIUM WIRE REINFORCED PLASTIC COMPOSITES. PART I. STATIC MECHANICAL PROPERTIES.
Technical rept. Aug 65-Aug 66,
Air Force Materials Lab Wright-Patterson AFB Ohio
H. S. Schwartz, and R. T. Schwartz. Jan 67, 31p Rept no. AFML-TR-66-404-Pt-1

Descriptors: (*Mechanical properties, *Reinforced plastics), Beryllium, Composite materials, Wire, Bonding, Deformation, Stresses, Plasticity, Buckling (Mechanics), Fracture (Mechanics), Tests, Failure (Mechanics).

Unidirectional and multidirectional composites of five mil diameter beryllium wire combined with an epoxy resin were fabricated and their mechanical behavior in tension, compression, flexure, and shear loading modes determined. The composites possessed good bonding between the filament and matrix. Continuity in the filament and matrix phases was apparently maintained at all stress levels up to failure. In general, the composite stress-strain behavior reflected that of the beryllium reinforcement, with an initial linear relationship followed by decreasing stress-strain rate to failure. The yield strengths of the composites at 0.2% offset strain were 80-90% of the ultimate strengths. The efficiency with which the beryllium reinforcement modulus and strength was translated into composite properties was greater than 80%. The composites failed by plastic deformation sometimes followed by buckling (compression) or fracture (tension). Plastic deformation in a composite may be desirable as a mechanism for redistributing local stress concentrations and increasing the energy required to cause failure. The specific elastic modulus and specific ultimate strength of the beryllium composites were high, but their proportional limits were less than one-third of the ultimate strength. Variation of the moduli with stress above the proportional limit is an important consideration, especially in connection with buckling phenomena. (Author)
AD-657 309 HC$3.00 MF$0.65

LIGHT SCATTERING BY BANDED SPHERULITES.
Massachusetts Univ Amherst Polymer Research Inst
For primary bibliographic entry see Field 20C.
AD-657 351 HC$3.00 MF$0.65

FRACTOGRAPHIC STUDIES WITH A LINEAR OF FATIGUE FRACTURE.
Columbia Univ New York Inst for the Study of Fatigue and Reliability
For primary bibliographic entry see Field 20K.
AD-657 373 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

11J. Rubbers

SPACE ENVIRONMENTAL EFFECTS ON MATERIALS AND COMPONENTS, VOLUME I. ELASTOMERIC AND PLASTIC MATERIALS. APPENDIX A THROUGH I,
Battelle Memorial Inst Columbus Ohio
For primary bibliographic entry see Field 11I.
AD-656 925 HC$3.00 MF$0.65

THE DICHROISM AND BIREFRINGENCE OF POLYMERS CONTAINING POLYENE SEGMENTS. PART I.
Massachusetts Univ Amherst Polymer Research Inst
For primary bibliographic entry see Field 7D.
AD-657 352 HC$3.00 MF$0.65

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

A MODIFIED VERSION OF PRICE'S THEOREM.
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
For primary bibliographic entry see Field 9D.
AD-656 791 Not available from CFSTI.

ASYMPTOTIC VARIANCES AND COVARIANCES OF MAXIMUM-LIKELIHOOD ESTIMATORS, FROM CENSORED SAMPLES, OF THE PARAMETERS OF WEIBULL AND GAMMA POPULATIONS.
Revised ed.,
Aerospace Research Labs Wright-Patterson AFB Ohio
H. Leon Harter, and Albert H. Moore. 24 Oct 66, 17p Rept no. ARL-67-0130
Revision of manuscript submitted 24 Mar 65.
Availability: Published in The Annals of Mathematical Statistics v38 n2 p557-70 Apr 1967.

Descriptors: (*Statistical analysis, Sampling), Monte Carlo method, Probability density functions, Convergence, Iterative methods.
Identifiers: Maximum likelihood, Information matrix.

For ordered samples of size n, with proportions q1 and q2 of the sample values censored from below and from above, respectively, from three parameter Weibull and gamma populations, expressions are given for the elements of the maximum-likelihood information matrices, each element being the negative of the expected value of one of the second partial derivatives of the likelihood function with respect to the parameters. (Author)
AD-656 833 Not available from CFSTI.

ON SIDED INVERSES AND ONE-SIDED IDENTITIES IN RINGS,
Naval Ordnance Test Station China Lake Calif
W. O. Alltop. Jun 67, 18p Rept no. NOTS-TP-4322

Descriptors: (*Rings (Mathematics), Algebra), Mapping (Transformations), Polynomials, Identities, Groups (Mathematics).

Properties of rings with one-sided inverses or one-sided identities are investigated. A characterization of rings with one-sided identities is given. Some structure theory regarding rings with one-sided inverses is developed. (Author)
AD-656 895 HC$3.00 MF$0.65

TABLES OF SPHEROIDAL WAVE FUNCTIONS. PART 3. SECOND VOLUME OF OBLATE RADIAL FUNCTIONS OF THE FIRST AND SECOND TYPE,
Naval Research Lab Washington D C
S. Hanish, R. V. Baier, W. H. Buckler, and Berthel K. Carmichael. 24 Apr 67, 288p Rept no. NRL-6543-Pt-3
See also AD-646 793 and AD-650 575.

Descriptors: (*Wave functions, Tables), Mathematical analysis, Electromagnetic waves, Acoustics, Scattering, Diffraction, Underwater sound, Nuclear energy levels.

The theory of oblate spheroidal wave functions is briefly reviewed and a list of literature references to applications of oblate spheroidal theory is furnished. Formulas useful for the numerical calculation of oblate radial functions of the first and second type, together with their first derivatives, are derived and explained. A step-by-step procedure of computation is then outlined together with an indication of precision obtained and method of checking. Finally a computer-printout tabulation of 48,600 entries comprising radial functions and their derivatives is reproduced. The range of parameters m, l, g, and xi covered in these tables is m = 0 (1)2, l = 9 (1)18, g = 0.1 (0.1)1 (0.2)8, and xi = 0.1 (0.1)0.9. (Author)
AD-656 898 HC$3.00 MF$0.65

NUMERICAL INVESTIGATION OF HIGHER ORDER DIFFERENCE METHODS FOR SOLVING ELLIPTIC PARTIAL DIFFERENTIAL EQUATIONS,
Naval Ordnance Lab White Oak Md
Don R. Smith, and Frederick K. Ullman. Jun 67, 43p Rept no. NOLTR-67-51

Descriptors: (*Partial differential equations, *Difference equations), Approximation (Mathematics), Operators (Mathematics), Theorems, Inequalities, Convergence, Numerical analysis.
Identifiers: Euclidean space.

The Dirichlet problem for the Poisson equation delta U = G in a domain D is considered. It has been thought in the past that the use of higher order difference schemes in the approximate solution of such problems is not practical. However, results due to Bramble and Hubbard show that when G is sufficiently smooth, a truncation error of O (h superscript 4) can be obtained by use of a difference scheme which is O (h superscript 4) in the interior but only O (h superscript 2) near the boundary, where h i sthe mesh spacing. Other results, due to Bramble, Hubbard, and Zlamal, give error estimates when the function G has an isolated singularity in D satisfying certain conditions. In this report, the approximate solution of the preceding Dirichlet problem is carried out for several functions G and for several domains D, with boundary values such that the solutions are known exactly. The difference schemes used are those for which error estimates were given by the preceding authors. The results show that these error estimates can be very useful in practice, and that it may be more economical in some cases to

use a higher order difference scheme together with a larger value of the mesh spacing h. (Author)
AD-656 902 HC$3.00 MF$0.65

A CLASS OF EPSILON BAYES TESTS OF A SIMPLE NULL HYPOTHESIS ON MANY PARAMETERS IN EXPONENTIAL FAMILIES.
Technical rept.,
Stanford Univ Calif Dept of Statistics
Carl Morris. 13 Jul 67, 84p Rept no. TR-57
Contract Nonr-225 (72)

Descriptors: (*Statistical analysis, Exponential functions), Random variables, Theorems, Probability, Matrix algebra, Distribution theory.

Xl,...Xk are observed as independent one-dimensional random variables, Xi being the sufficient statistic for a parameter theta i in an exponential family. The problem of testing the hypothesis Ho: theta i = theta oi is considered when k is large. The usual hypothesis testing loss structure and near alternatives for moderate size and power are assumed. If epsilon > 0 is given and k is large enough, it is shown that the Bayes test for a prior distribution pi making the (theta i) independent under Hl has Bayes risk at most epsilon less than a test based on a non-negative definite quadratic form which rejects Ho when summation (aiXi + bi (Xi squared)) = or > c. The constants (ai) and (bi) are determined by the first two moments of (theta i) under pi, reducing the class of decision procedures under consideration. The approximate Bayes risk and location of the prior distribution under pi is determined. The quadratic forms are shown to be proper Bayes for fixed k. For large k, epsilon-minimax tests are determined. Appl ations of the above results are made to the binomial, negative binomial, Poisson, normal and gamma distributions by introducing the concept of quadratic moment structure. Some large deviation theorems are proved for exponential families. (Author)
AD-656 909 HC$3.00 MF$0.65

A NOTE ON CAUCHY'S THEOREM,
Carnegie Inst of Tech Pittsburgh Pa Dept of Mathematics
Morton E. Gurtin, Victor J. Mizel, and William O. Williams. Jun 67, 10p Rept no. 67-23
Contracts N00014-67-A-0314-0001, Nonr-510 (31)

Descriptors: (*Stresses, Theorems), Vector spaces, Continuum mechanics, Sequences.
Identifiers: Cauchy's Theorem.

Cauchy's fundamental theorem, which in the framework of mechanics gives the existence of a stress tensor, is established under very weak hypotheses. (Author)
AD-656 923 HC$3.00 MF$0.65

PATTERN SEPARATION BY LINEAR PROGRAMMING.
Memorandum rept.,
Ballistic Research Labs Aberdeen Proving Ground Md
Malcolm S. Taylor. Jul 67, 12p Rept no. BRL-MR-1856

Descriptors: (*Pattern recognition, *Linear programming), Set theory, Inequalities, Mathematical analysis.
Identifiers: Euclidean space.

The problem of pattern separation, arising in the study of pattern recognition, currently of interest at BRL, is presented and formulated as a problem in linear programming. Some preliminary computational results are noted. (Author)
AD-656 928 HC$3.00 MF$0.65

INVARIANT ESTIMATION OF STOCHASTIC SYSTEM PARAMETERS,
Polytechnic Inst of Brooklyn N Y
L. Shaw, and G. Robinson. Jun 67, 9p
AROD-5211:4
Contracts DA-31-124-ARO (D)-316, AF 49 (638)-1600
Prepared in cooperation with Middle East Technological Univ., Ankara (Turkey).
Availability: Published in International Federation of Automatic Control Symposium, Prague (Czechoslovakia), 12-17 Jun 1967.

Descriptors: (*Regression analysis, Stochastic processes), Transformations (Mathematics), Control, Polynomials, Sequences, Random variables, Probability.

This paper deals with the estimation of the coefficients of a finite-order autoregression. That is, samples x sub 1, x sub 2, ..., x sub N of a random sequence generated by an M'th order linear recursion x sub n + a sub 1 x sub n+...+ a sub M x sub (n-M) = w sub n (1) are used as data for estimating the unknown coefficients a sub 1, ..., a sub M. Equation (1) is known as an autoregressive scheme when the random input sequence (w sub n) consists of orthogonal random variables having a common mean-squared value. We begin with a description of the general features of an invariant estimation problem. Then the invariant approach to estimation of autoregressive parameters is developed for a first-order case, M = 1 in Eq. (1). Finally, extensions to higher order systems are outlined.
AD-656 953 Not available from CFSTI.

THE METASTABLE HOMOTOPY Sn,
Northwestern Univ Evanston Ill
Mark Mahowald. 1967, 85p
AROD-4489:8
Contract DA-31-124-ARO (D)-144
Availability: Published in Memoirs of the American Mathematical Society n72 81p 1967.

Descriptors: (*Algebraic topology, Spheres), Sequences, Theorems, Mapping (Transformations), Mathematics.
Identifiers: Toda's theorem.

The Adams spectral sequence is the most powerful tool presently available for studying the stable homotopy of spheres. The Adams theory is essentially a stable one, in its present form, and so gives information about pi subscript j (S superscript n) only for j < 2n-1. The next block of n-1 groups, i.e., for 2n-1 = or < j < 3n-2, is called the metastable range and it too has many regular properties. But stable arguments do not in general apply. The main result now available for this range of groups is a theorem of Toda. Our object is to bring to Toda's theorem the power of stable methods developed by Adams.
AD-656 959 Not available from CFSTI.

SIGNAL FLOW GRAPHS OF SAMPLED-DATA SYSTEMS: A NEW FORMULATION.
Revised ed.,
University of Southern California Los Angeles Dept of Electrical Engineering
Milan Sedlar, and George A. Bakey. 30 Dec 66, 10p
AFOSR-67-1866
Grant AF-AFOSR-1018-66
Revision of manuscript submitted 1 Apr 66.
Availability: Published in IEEE Transactions on Automatic Control vAC-12 n2 p154-61 Apr 1967.

Descriptors: (*Graphics, *Topology), (*Control, Theory), Linear systems, Control systems, Sampling, Mathematical models.
Identifiers: Signal flow graphs.

The pictorial representation of either continuous or discrete systems accomplished by the signal flow-graph technique is extended to mixed discrete-continuous (hybrid) systems. A new flowgraph symbol is introduced in order to distinguish between continuous and discrete variables as well as to indicate the operation of sampling. For the case of linear, time-invariant systems, the algebra for manipulation of such graphs is given. It is shown that the input-output relations of the system are related to certain topological properties of the corresponding signal flow graph. This relation is established and illustrated by several examples. In the case of continuous (or completely discrete) systems, it is shown that the general input-output relation reduces to Mason's formula. (Author)
AD-656 980 Not available from CFSTI.

FOKKER ACTION PRINCIPLE AND THE HYPERBOLIC MOTION,
Syracuse Univ N Y Dept of Physics
A. Staruszkiewicz. 16 Nov 66, 4p
AFOSR-67-1843
Grant AF-AFOSR-789-66
Availability: Published in American Journal of Physics v35 n5 p437-8 1967.

Descriptors: (*Equations of motion, Particles), Momentum, Green's function, Motion, Physics.
Identifiers: Action principle, Minkowski space.

The equations of motion for the Fokker action principle in the case of the two-dimensional Minkowski space have been solved exactly. The whole set of solutions contains four parameters, which can be interpreted as the initial positions and velocities of two particles. All solutions, with the exception of a three-parameter subset, have four discontinuities in the second derivatives. (Author)
AD-656 984 Not available from CFSTI.

MARKOV CHAINS RECURRENT IN THE SENSE OF HARRIS,
Minnesota Univ Minneapolis Dept of Mathematics
Benton Jamison, and Steven Orey. 19 Nov 66, 10p
AFOSR-67-1860
Grants AF-AFOSR-381-66, NSF-GP-3906
Availability: Published in Z. Wahrscheinlichkeitstheorie Verw. Geb. v8 p41-8 1967.

Descriptors: (*Statistical processes, Theorems), (*Probability, Theorems), Random variables, Sequences, Potential theory, Banach space, Convergence.
Identifiers: Harmonic functions.

The tail sigma-field of any Markov process recurrent in the sense of Harris is shown to consist of a finite number of atoms. (Author)
AD-656 986 Not available from CFSTI.

PSEUDO-RADIATION CONDITIONS FOR DERIVATIVES OF RADIATING FUNCTIONS,
New York Univ N Y Courant Inst of Mathematical Sciences
Richard C. Morgan. 1967, 6p
AFOSR-67-1859
Grant AF-AFOSR-537-64
Availability: Published in Journal of Mathematical Analysis and Applications v18 n3 p561-4 Jun 3, 1967.

Descriptors: (*Partial differential equations, Theorems), Boundary value problems, Diffraction, Electromagnetic waves.
Identifiers: Wave equations, Uniqueness theorems.

This paper introduces a new radiation condition satisfied by cartesian derivatives of a radiating solution to the reduced wave equation. The function g (x,y) and its derivatives are assumed to satisfy the differential Sommerfeld condition lim as r approaches infinity of (the square root of r (the partial derivative of g with respect to r - iKg)) = 0 uniformly in theta, a = or < theta = or < b and certain boundedness conditions at infinity. Under these assumptions, it follows that lim as r approaches infinity, of the integral between the limits alpha

sub o (lower), beta sub o (upper) of the quantity f (theta)L (D to the alpha power, g) (r, theta)d (theta) = 0, a = or < alpha sub o = or < beta sub o = or < (b) where the maximum value of alpha depends on the assumed degree of regularity of g. Here L represents the Sommerfeld radiation operators and f (theta) is an arbitrary function of theta having a bounded theta-derivative. (Author)
AD-656 987 Not available from CFSTI.

THREE FORTRAN PROGRAMS THAT PERFORM THE COOLEY-TUKEY FOURIER TRANSFORM.
Technical note,
Massachusetts Inst of Tech Lexington Lincoln Lab
N. M. Brenner. 28 Jul 67, 35p Rept no. TN-1967-2
ESD-TR-67-462
Contract AF 19 (628)-5167.

Descriptors: (*Integral transforms, Computer programs), Programming (Computers), Algorithms, Optimization, Accuracy, Subroutines.

Three programs are described and listed, all written in USASI Basic Fortran, which perform the discrete Fourier transform upon a multidimensional array of floating point data. The data may be either real or complex, with a savings in running time for real over complex. The transform values are always complex and are returned in the array used to carry the original data. The running time is much shorter than that of any program performing a direct summation, even when sine and cosine values are precalculated and stored in a table. For example, on a CDC 3300 with floating point add time of six microseconds, a complex array of size 80 x 80 can be transformed in 19.2 seconds. Besides the main array, only a working storage array of size 160 need be supplied. (Author)
AD-657 019 HC$3.00 MF$0.65

DIGITAL COMPUTER PROGRAM FOR ROOT LOCUS ANALYSES OF OPEN-LOOP TRANSFER FUNCTIONS CONTAINING AN e-ts LEAD-LAG TERM,
California Univ Berkeley Radio Astronomy Lab
George R. Schubert. Sep 65, 36p Rept no. AFFDL-FDCC-TM-65-43

Descriptors: (*Transfer functions, Computer programs), (*Control systems, Transfer functions), Exponential functions, Polynomials, Approximation (Mathematics), Subroutines.
Identifiers: FORTRAN IV.

Frequently it is desirable in system control problems to find poles of transfer functions of the form (G (s) e to the power (- tau s))/ (1 + G (s) e to the power (- tau s)) where G (s) is either the ratio of unfactored polynomials or the ratio of linear and quadratic factors in either root-locus or Bode form. A FORTRAN IV digital computer program has been written by the author to find these poles. This paper describes the usage of this routine. Test cases are given showing sample input and output. (Author)
AD-657 037 HC$3.00 MF$0.65

DISCREET SYSTEMS AND DIGITAL COMPUTER CONTROL,
State Univ of New York Stony Brook
For primary bibliographic entry see Field 9B.
AD-657 041 Not available from CFSTI.

ON THE COMPUTATION OF THE NUMBER OF ELEMENTS IN COMBINATIONS OF SETS,
New York Univ N Y Dept of Industrial Engineering and Operations Research
Eugene D. Homer. 1967, 12p
AFOSR-67-1880
Grant AF-AFOSR-621-64
Availability: Published in American Mathematical Monthly v74 n5 p513-22 May 1967.

Descriptors: (*Set theory, *Algebras), Numerical analysis, Probability, Matrix algebra, Binary arithmetic.

This paper presents a method for the computation of the number of elements in combinations of finite sets, given the number of elements in simple sets and/or other combinations of sets. The method uses a matrix formed by a process similar to Ledley's 'designation number' technique for the digitalization of Boolean algebra, and involves only matrix operations. No algebraic manipulations are required, thereby offering the possibility of readily programming the method for digital computers. The paper also treats the problem of insufficient given data. (Author)
AD-657 056 Not available from CFSTI.

THE THEORY AND AN EXPERIMENT ON A SIMPLE FUNGUS-EATER GAME,
California Univ Los Angeles Western Management Science Inst
For primary bibliographic entry see Field 5J.
AD-657 058 HC$3.00 MF$0.65

A TABULATION OF SELECTED CONFLUENT HYPERGEOMETRIC FUNCTIONS.
Technical rept.,
Harvard Univ Cambridge Mass Cruft Lab
David Middleton, and Virginia Johnson. 5 Jan 52, 62p Rept no. TR-140
Contract N5ori-76 (01)

Descriptors: (*Hypergeometric functions, Tables), Accuracy, Noise, Analytic functions, Differential equations, Series, Numerical analysis.

A tabulation of the confluent hypergeometric function 1F1 (alpha;beta;-p) is given for half-integral values of alpha (=-1/2, 1/2, 3/2,...) and integral values of beta (=1,2,...10). The mesh is 0.25 for (0 < or - p < or - 2.0) and 0.50 for (2.0 < p < or - 10.0), and additional values for p = 20,30,...100, in steps of 10, have been computed. Accuracy of five significant figures is maintained in most instances. A short account of some of the more useful properties of the confluent hypergeometric function, and some of its applications in noise problems, as well as a comprehensive description of the methods of calculation, is included.
AD-657 097 HC$3.00 MF$0.65

DENSITY FUNCTIONS FOR SOME RANDOM SUMS OF NORMAL, SINUSOIDAL, AND RAYLEIGH VARIABLES,
Naval Missile Center Point Mugu Calif
C. O. Archer. 9 Aug 67, 131p Rept no. NMC-TM-67-35

Descriptors: (*Probability density functions, Random variables), Theorems, Radar signals, Signal-to-noise ratio, Mathematical analysis, Probability.
Identifiers: Density functions.

The sums of random variables having Rayleigh, normal, and sinusoidal probability density functions are investigated. The resulting density function of the sum is given and the effect of adding random variables in various ratios is analyzed by studying the resulting density functions through their graphs. In the appendix, derivations of the density functions are shown. (Author)
AD-657 121 HC$3.00 MF$0.65

ON THE CONTINUITY OF A NONLINEAR INTEGRAL OPERATOR.
APL library bulletin translations series,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
P. P. Zabreiko. 26 May 67, 8p Rept no. TG-230-T-525
TT-67-62664
Contract NOw-62-0604
Trans. of Sibirskii Matematicheskii Zhurnal (USSR) v5 n4 p958-60 1964.

Descriptors: (*Operators (Mathematics), Integrals), Theorems, Inequalities, Sequences, Convergence, USSR.

Let G and G* be bounded closed regions in R superscript n; let K (t,s,u) and S (t,s,u) carry G* x G x R into R and satisfy the 'Caratheodory conditions': measurable in t and s for all u, and continuous in u for almost all t,s. The author gives a majorization criterion for continuity and 'definition everywhere' of the Urysohn operator Kx (t) = the integral taken over G of K (t,s,x (s)) ds.
AD-657 162 HC$3.00 MF$0.65

DATA SMOOTHING AND TREND ESTIMATION.
Research paper,
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
Robert D. Turner. Aug 67, 40p Rept no. RP-P-324
IDA/HQ-67-5917
Contract DAHC15-67-C-0011

Descriptors: (*Statistical analysis, *Least squares method), Optimization, Sampling, Taylor's series, Polynomials, Random variables, Algorithms, Numerical analysis, Predictions, Curve fitting.

Explicit formulas are presented for estimating position, velocity, and acceleration in low-order polynomial trends, based on least-squares smoothing of sampled data accompanied by statistically uncorrelated measurement errors. Formulas are also given for interpolation and prediction of position and velocity. Expressions for the variances and covariances of consistent position, velocity, and acceleration estimates are given, and the systematic errors accruing from use of a trend estimation basis which is one order lower than the actual trend are presented. One interesting result is that the normalized correlation between the errors in an estimate of current position and those in an estimate of current velocity approaches (1/2) (the square root of 3) when the number of measurements in the estimates becomes large. Finally, the problem of implementing real-time least-squares estimation and prediction formulas in practical systems is discussed. It is concluded that arithmetic execution time requirements can be relaxed by generating certain sums recursively, and that data storage requirements can frequently be eased by collapsing the raw data into short-term-average samples. (Author)
AD-657 165 HC$3.00 MF$0.65

CONVERGENCE PROOFS FOR GLUCKSMAN'S PROCEDURE.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 9B.
AD-657 171 HC$3.00 MF$0.65

FUNCTIONS OF PROCESSES WITH MARKOVIAN STATES.
Technical rept.,
Michigan State Univ East Lansing Dept of Statistics
Martin Fox, and Herman Rubin. 21 Aug 67, 17p Rept no. TR-17, RM-193
Contracts AF 19 (628)-355, Nonr-2587 (02)

Descriptors: (*Stochastic processes, Theorems), Statistical processes, Probability, Cloud cover, Mathematical models, Matrix algebra.

Given a process (Yn), let epsilon be a state of finite rank. An example is given in which Yn = f (Xn), (Xn) is countable state, stationary, Markov, (Yn) is stationary with one state each of ranks 1 and 3, yet it is impossible to take (Xn) to be finite state Markov. In general it is proved that Yn = f (Xn) where epsilon = f (epsilon i) (i = 1,2,...), de a = f (delta) for delta not equal to epsilon and the epsilon i are Markovian states. If epsilon has rank 2 it is proved that two states suffice and that the rank of delta not equal to epsilon in (Xn) is the same

as in (Yn). Finally, it is proved that if epsilon has rank 2 and (Yn) is stationary, (Xn) is stationary. (Author)
AD-657 176 HC$3.00 MF$0.65

SU UN METODO ITERATIVO PER LA RISOLUZIONE DI SISTEMI NON LINEARI (An Iterative Method for the Resolution of Nonlinear Systems),
Politecnico Di Milano (Italy) Istituto Di Matematica
Laura Gotusso. 1965, 20p Rept no. Pub-417
Text in Italian.
Availability: Published in Rendiconti dell'Istituto Lombardo di Scienze e Lettere v99 p933-49 1965.

Descriptors: (*Iterative methods, Nonlinear systems), Equations, Numerical analysis.
AD-657 205 Not available from CFSTI.

SOLUZIONI QUASI-PERIODICHE DI EQUAZIONI FUNZIONALI LINEARI E NON LINEARI (Quasi-Periodic Solutions of Functional Linear and Non-Linear Equations),
Politecnico Di Milano (Italy) Istituto Di Matematica
Luigi Amerio. 1965, 21p Rept no. Pub-419
Text in Italian.
Availability: Published in Ill Reun. Math d'expr Latine n20-23 p15-33 Sep 1965.

Descriptors: (*Equations, Periodic variations), Linear systems, Nonlinear systems, Integral equations, Inequalities.
AD-657 206 Not available from CFSTI.

QUELQUES PROPRIETES DES SYSTEMES LINEAIRES D'HYPERSURFACES TRACEES SUR UNE VARIETE ALGEBRIQUE (Some Properts of Linear Systems of Hypersurfaces Developed on an Algebraic Variety),
Politecnico Di Milano (Italy) Istituto Di Matematica
Ermanno Marchionna. 1965, 10p Rept no. Pub-420
Text in French.
Availability: Published in Ill Reun. Math. d'Expr. Latine n20-23 p69-76 Sep 1965.

Descriptors: (*Topology, Surfaces), Inequalities, Linear systems.
Identifiers: persurfaces.
AD-657 207 Not available from CFSTI.

ON THE HOMOLOGY GROUPS OF STEIN SPACES,
Institute for Advanced Study Princeton N J
Raghavan Narasimhan. 22 Nov 66, 10p
AFOSR-67-1938
Grant AF-AFOSR-1071-66
Availability: Published in Inventiones Math v2 p377-85 1967.

Descriptors: (*Groups (Mathematics), *Topology), Sequences, Mapping (Transformations), Theorems, Approximation (Mathematics).
Identifiers: Manifolds (Mathematics), Stein spaces.

It is proven that if X is an arbitrary Stein space (with singularities) of dimension n, then H sub k (X,Z) is 0 if k > n, and torsion free if k = n. The proof uses the following fact: Any analytic set on a Stein space X has a fundamental system of neighborhoods which are Runge in X. (Author)
AD-657 238 Not available from CFSTI.

INNER FUNCTIONS IN POLYDISCS,
Wisconsin Univ Madison
Walter Rudin. 21 Nov 66, 7p
AFOSR-67-1944
Grant AF-AFOSR-1160-66
Prepared in cooperation with California Univ., San Diego.
Availability: Published in Bulletin of the American Mathematical Society v73 n3 p369-72 May 1967.

Descriptors: (*Functions, Theorems), Complex variables, Series, Mathematics.
Identifiers: Polydiscs.

The 'inner functions' under consideration are, by definition, those bounded holomorphic functions g in the unit polydisc U superscript n (n > 1) whose radial limits g* have absolute value 1 at almost all points of the distinguished boundary T superscript n. Various types of inner functions are classified. It is proved that if a bounded holomorphic f in U superscript n has the absolute value of f* upper semi-continuous on T superscript n, then f has the same zeros in U superscript n as some inner function. (If n = 1, the conclusion holds without assuming upper semi-continuity of f*, but a computer-example shows that this hypothesis cannot be dropped if n = or > 2.) The same conclusion is also shown to hold if the least n-harmonic majorant of log absolute value of f is the real part of a holomorphic function in U superscript n. It is also proved that to every positive bounded lower semi-continuous function F on T superscript n there corresponds a bounded holomorphic f in U superscript n such that the absolute value of f* = F almost everywhere on T superscript n. (Author)
AD-657 245 Not available from CFSTI.

ON ALGEBRAS OF FINITE REPRESENTATION TYPE.
Final technical rept.,
Oregon Univ Eugene
Spencer E. Dickson. 31 Aug 67, 35p
Contract N00014-66-C-0293
Rept. on Research on Various Problems in Abstract Algebra.

Descriptors: (*Algebras, *Groups (Mathematics)), Rings (Mathematics), Theorems, Mathematics.

This paper launches a new attack on the Brauer-Thrall conjecture that bounded representation type implies finite representation type for algebras by showing the relevance of the structure of indecomposables of certain special types, namely the stable (every maximal submodule is indecomposable), the costable (having the dual property), and the stable-costable indecomposable modules (having both properties). We give sufficient conditions on the structure of the stable (resp. costable, stable-costable) indecomposables in order that the algebra will have at most finitely many isomorphism classes of modules of any finite composition length. Turning our attention to quasifrobenius algebras with large kernels (i.e., satisfying the condition that a nilpotent endomorphism of any indecomposable of finite length has large (or essential) kernel) we give somewhat sharper conditions that bounded type implies finite type for these algebras and make a contribution toward an open question of Curtis and Jans. An algebra has large kernels in particular when every indecomposable has square-free socle, which was the main hypothesis of the cited paper of Curtis and Jans.
AD-657 251 HC$3.00 MF$0.65

FUNCTIONS SATISFYING A WEIGHTED AVERAGE PROPERTY. II,
North Carolina Univ Chapel Hill
Anil Kumar Bose. 6 Nov 65, 16p
AROD-5009:2
Contract DA-31-124-ARO (D)-267
Prepared in cooperation with Alabama Univ., Tuscaloosa.
Availability: Published in Transactions of the American Mathematical Society v124 n3 p540-51 Sep 1966.

Descriptors: (*Functions, Differential equations), Theorems, Exponential functions, Mathematics.
Identifiers: Weight functions.

In this paper the authors propose to deduce in terms of the Weighted Average Property a necessary and sufficient condition for a weight function to be a solution of delta w + lambda w = 0. From this result they will prove the main theorem, S (w,R) is infinite dimensional if and only if w is a solution of delta w + lambda w = 0. (Author)
AD-657 264 Not available from CFSTI.

SYMBOLIC MATHEMATICAL LABORATORY.
Doctoral thesis,
Massachusetts Inst of Tech Cambridge
William Arthur Martin. Jan 67, 340p Rept no. MAC-TR-36
Contract Nonr-4101 (01)

Descriptors: (*Computer programs, Mathematics), Algorithms, Time sharing, Theses, Real time, Subroutines, Data processing systems, Programming (Computers), Symbols, Coding, Input-output devices, Graphics, Transformations (Mathematics).
Identifiers: Light pens, On-line systems, LISP, Non-numerical analysis.

A large computer program has been developed to aid applied mathematicians in the solution of problems in non-numerical analysis which involve tedious manipulations of mathematical expressions. The mathematician uses typed commands and a light pen to direct the computer in the application of mathematical transformations; the intermediate results are displayed in standard text-book format so that the system user can decide the next step in the problem solution. Three problems selected from the literature have been solved to illustrate the use of the system. A detailed analysis of the problems of input, transformation, and display of mathematical expressions is also presented. (Author)
AD-657 283 HC$3.00 MF$0.65

DISCONTINUOUS VECTOR FIELDS AND FEEDBACK CONTROL,
Brown Univ Providence R I
H. Hermes. 1967, 12p
AFOSR-67-1926
Grants AF-AFOSR-693-65, NGR-40-002-015
Availability: Published in Differential Equations and Dynamical Systems p155-65 1967.

Descriptors: (*Control systems, Feedback), (*Vector spaces, Control systems), Stability, Initial value problems, Topology, Equations of motion, Optimization, Differential equations, Measurement, Theorems.
Identifiers: Euclidean space.

We consider the problem of feedback control for a system with dynamics described by a set of differential equations of the form (dx/dt) (t) = F (x (t),u (x (t))). A feedback control u is a function whose values u (x) are prescribed as a function of the state x of the system. The usual method of generating feedback controls is by synthesis from the open loop problem, i.e. u (xo) is assigned the value for the optimal open loop controller for a problem with arbitrary initial data x (0) = xo. In general u will be discontinuous hence the vector field X (x) = F (x,u (x)) will be discontinuous and one must deal with differential equations with discontinuous right sides. If an error epsilon (t) is made in measuring the state x (t), one must consider (1) (dx/dt) (t) = X (x (t) + epsilon (t)) rather than (2) (dx/dt) (t) = X (x (t)). The vector field X is said to be stable with respect to measurement if solutions of (1) and (2) satisfying the same initial data, remain arbitrarily close over any finite time interval if the measurement error epsilon is sufficiently small. Examples are given to show that non-uniqueness in the open loop problem may lead to a synthesized control with vector field unstable with respect to measurement, and the concept is related, theoretically, to Filippov solutions. (Author)
AD-657 288 Not available from CFSTI.

RANDOM BINARY SEQUENCES.
Naval Weapons Center China Lake Calif
For primary bibliographic entry see Field 9D.
AD-657 307 HC$3.00 MF$0.65

ESTIMATION OF PARAMETERS FROM LARGE SAMPLES ARBITRARILY CENSORED OR TRUNCATED.
Rept. for May 66-May 67,
Weibull (Waloddi) Lausanne (Switzerland)
Waloddi Weibull. 31 May 67, 32p Rept no. Scientific-5
AFML-TR-67-197
Contract AF 61 (052)-943

Descriptors: (*Sampling, *Statistical analysis), Approximation (Mathematics), Graphics, Matrix algebra, Tables.
Identifiers: Order statistics.

Approximation formulas,for the expected values, variances and covariances of the order statistics yi, which provide a very good approximation for sample sizes equal to or larger than N = 20, are developed. Their applications to graphical analysis and parameter estimations by use of desk computing machines and digital computers are demonstrated. Tables which simplify the computing procedure are presented. (Author)
AD-657 318 HC$3.00 MF$0.65

BLANCH ANNIVERSARY VOLUME,
Aerospace Research Labs Wright-Patterson AFB Ohio
John V. Armitage, Mark C. Breiter, Donald S. Clemm, Henry E. Fettis, and Gaetano Fichera.
21 Feb 67, 375p

Descriptors: (*Numerical analysis, Reviews), Operators (Mathematics), Nozzle gas flow, Transformations (Mathematics), Integral equations, Differential equations, Series, Special functions (Mathematical), Convergence, Hilbert space, Polynomials, Approximation (Mathematics), Heat transfer, Linear programming, Man-machine systems, Computers, Fourier analysis.
Identifiers: Eigenvalues.

Contents: The Lax-Wendroff method applied to axial symmetric swirl flow; Calculation of toroidal harmonics without recourse to elliptic integrals; Generalized biharmonic problem and related eigenvalue problems; On error bounds for the solution of systems of ordinary differential equations; Series expansions for the incomplete gamma function and its derivatives; Bounds on the value of a dirichlet integral representing a coefficient of apparent mass; Selection procedures based on covariance matrices of multivariate normal populations; Recursion formulas for polynomials in rational approximations to generalized hypergeometric functions; On degradation of combination locks and the maximum time to open them; Generalized trapezoid formulas and errors in romberg quadrature; Heat transfer in a plane incompressible laminar jet; Some computational aspects of the tensor product of linear programs; A difference inequality for operators in hilbert space; The mighty man-computer team; Products and quotients of generalized cauchy variables; Explorations of the shear flow over a cavity; Computation of the complex error function by continued fractions; Transformations to accelerate the convergence of fourier series.
AD-657 323 HC$3.00 MF$0.65

UN PROBLEMA DI REGOLARITA IN GEOMETRIA ALGEBRICA (A Problem of Regularity in Geometric Algebra),
Politecnico Di Milano (Italy) Istituto Di Matematica
Ermanno Marchionna. 1965, 24p Rept no. Pub-424
Text in Italian.
Availability: Published in Rendiconti del Seminario Matematico di Torino v25 p37-58 1965-66.

Descriptors: (*Algebraic geometry, Theorems), Topology, Inequalities, Mathematics.
AD-657 392 Not available from CFSTI.

SOLUZIONI QUASI-PERIODICHE DELL'EQUAZIONE NON OMOGENEA DELLE ONDE, CON TERMINE DISSIPATIVO NON LINEARE (Quasi-periodic Solutions of the Non-Homogeneous Wave Equation with Non Linear Dissipative Term),
Politecnico Di Milano (Italy) Istituto Di Matematica
Giovanni Prouse. 1965, 23p Rept no. Pub-415
Text in Italian.
Availability: Published in Rendiconti dell'Accademia Nazionale dei Lincei v38 n6 p804-7 Jul 1965; v39 p11-8, 155-60, 240-4 1965.

Descriptors: (*Partial differential equations, Nonlinea rsystems), Inequalities, Theorems, Periodic variations, Boundary value problems, Convergence.
Identifiers: Wave equation.

Object of these notes is the study of almost-periodic solutions of the non homogeneous wave equation with nonlinear dissipative term. Some general results regarding bounded solutioh are given and it is proved that under convenient assumption on the non linear term and the number of dimensions, there exists one, and only one a.p. solution, to which all other solutions asymptotically converge. (Author)
AD-65 7393 Not available from CFSTI.

SUL COMPORTAMENTO ASINTOTICO DELLE SOLUZIONI DI EQUAZIONI NON LINEARI DI TIPO PARABOLICO (The Asymptotic Comportment of a Solution of a Parabolic non Linear Equation),
Politecnico Di Milano (Italy) Istituto Di Matematica
Carla Vaghi. 1966, 16p Rept no. Pub-436
Text in Italian.
Availability: Published in Rendiconti dell'Accademia Nazionale dei Lincei v41 n1/2 25-31, 170-4 Sep-Oct 1966.

Descriptors: (*Partial differential equations, Nonlinear systems), Boundary value problems, Theorems, Inequalities, Mathematics.
Identifiers: Uniqueness theorem.

Consider the non linear parabolic equation (1) The partial derivative of z (x,t) with respect to t = Summation over i,j(i,..., m) of the quantity a sub ij (x,t) (the second partial derivative of z (x,t) with respect to x sub i, x sub j) - f (x, t, z, p) (x = x sub 1,..., x sub m, epsilon, Omega; p = p sub 1,..., p sub m); p sub i = the partial derivative of z with respect to x sub i, with the boundary condition z (x,t) at the boundary of Omega = o. Under appropriate assumptions on the function f (x, t, z, p), it is proved that all the solutions of (1) have the same asymptotic behaviour when t approaches + infinity. Subsequently, some uniqueness theorems of solutions bounded on minus infinity, + infinity are given. (Author)
AD-657 394 Not available from CFSTI.

PROBLEMI DI PROPAGAZIONE PER EQUAZIONI NON LINEARI DELLA FISICA MATEMATICA (Problems of Propagation through Non Linear Equations of Mathematical Physics),
Politecnico Di Milano (Italy) Istituto Di Matematica
Giovanni Prouse. 1966, 20p Rept no. Pub-438
Text in Italian.
Availability: Published in Rendiconti del Seminario Matematico e Fisico di Milano v36 p3-19 1966.

Descriptors: (*Nonlinear differential equations, Physics), Navier-Stokes equations, Initial value problems, Periodic variations, Partial differential equations, Mathematics.
Identifiers: Wave equation.

Some recent results concerning propagation problems for nonlinear equations of mathematical physics an illustrated. In particular the Navier-Stokes equations and the wave equation with non-linear dissipative term are considered; for these equations, the following problems are examined: the initial value problem, the problem of the existence of periodic solutions and that of the existence of almost-periodic solutions. (Author)
AD-657 395 Not available from CFSTI.

SOLUZIONI QUASI-PERIODICHE DI UN'EQUAZIONE A DERIVATE PARZIALI DEL TIPO DI FUCHS (Quasi-Periodic Solution of a Partial Derivative Equation of the Fuchs Type),
Politecnico Di Milano (Italy) Istituto Di Matematica
Maria Lavinia Ricci. 1966, 41p Rept no. Pub-440
Text in Italian.
Availability: Published in Annali di Matematica pura ed Applicata v73 p367-404 1966.

Descriptors: (*Partial differential equations, Periodic variations), Inequalities, Mathematics.
AD-657 397 Not available from CFSTI.

0 (5) POLYNOMIAL BASES,
Illinois Univ Urbana Dept of Physics
For primary bibliographic entry see Field 20J.
AD-657 399 Not available from CFSTI.

APPLICATION OF THE SMOOTH-SURFACE INTERFOLATION TO THE FINITE-ELEMENT ANALYSIS,
Massachusetts Inst of Tech Cambridge
For primary bibliographic entry see Field 20K.
AD-657 403 Not available from CFSTI.

LINEAR VERSUS LOGARITHMIC AVERAGING.
Naval Ship Research and Development Center Washington D C Acoustics and Vibration Lab
For primary bibliographic entry see Field 20A.
AD-657 404 Not available from CFSTI.

SOLUTION OF NONLINEAR FLOW PROBLEMS THROUGH PARAMETRIC DIFFERENTIATION,
Massachusetts Inst of Tech Cambridge
For primary bibliographic entry see Field 20D.
AD-657 405 Not available from CFSTI.

ON FITTING WITH FUNCTIONAL POLYNOMIALS,
Washington Univ St Louis Mo
J. Zaborsky, and R. H. Flake. 19 Jan 66, 8p
AFOSR-67-1947
Grant AF-AFOSR-482-64
Prepared for presentation at Joint Automatic Control Conference, Seattle, Wash., August 17-19 1966. Prepared in cooperation with Texas Univ., Austin.
Availability: Published in Journal of Basic Engineering p399-405 Jun 1967.

Descriptors: (*Polynomials, *Nonlinear systems), (*Differential equations, *Integral transforms), Approximation (Mathematics), Interpolation, Integration, Green's function, Input-output devices, Correlation techniques.

A method is introduced for identifying a functional polynomial to represent an input-output relation which is known in terms of measurements over finite fine intervals. Zero or non-zero initial conditions are admissible. Examples are presented for both zero and non-zero initial conditions. (Author)
AD-657 413 Not available from CFSTI.

THE LINEAR EQUATIONS PROBLEM.
Technical rept.,
Stanford Univ Calif Applied Mathematics and Statistics Labs
Wallace Givens. 1 Dec 59, 29p Rept no. TR-3
Contract Nonr-225 (37)

Descriptors: (*Equations, Numerical analysis), Matrix algebra, Linear systems, Determinants, Algorithms, Mathematics.

The simplest case of a linear equations problem is that of finding m unknowns by solving m linear algebraic non-homogeneous equations with given coefficients and constant terms. If this solution is carried out m times with the columns of the identity matrix as successive choices for the constant vector, the resulting sets of solutions form the columns of the inverse of the matrix coefficients. Another situation which is disposed of very simply in a purely theoretical treatment but which is nontrivial in practice is that in which there are more equations than unknowns, yet a solution is known, or at least believed, to exist. The purpose of the present paper is to describe a method of solving in a routine way a class of linear algebraic problems which include the various special cases mentioned.
AD-657 448 HC$3.00 MF$0.65

COLLECTIVELY COMPACT OPERATOR APPROXIMATIONS. LECTURES PRESENTED JULY-AUGUST 1967.
Technical rept.,
Stanford Univ Calif Dept of Computer Science
P. M. Anselone, and Lyle Smith. 17 Sep 67, 63p Rept no. CS-76
Contract Nonr-5962 (00)

Descriptors: (*Operators (Mathematics), *Banach space), Integral equations, Approximation (Mathematics), Convergence, Perturbation theory, Mapping (Transformations), Theorems.
Identifiers: Eigenvalues.

A general approximation theory for linear and nonlinear operators on Banach spaces is presented. It is applied to numerical integration approximations of integral operators. Convergence of the operator approximations is pointwise rather than uniform on bounded sets, which is assumed in other theories. The operator perturbations form a collectively compact set, i.e., they map each bounded set into a single compact set. In the nonlinear case, Frechet differentiability conditions are also imposed. Principal results include convergence and error bounds for approximate solutions and, for linear operators, results on spectral approximations. (Author)
AD-657 450 HC$3.00 MF$0.65

INADMISSIBILITY OF VARIOUS 'GOOD' STATISTICAL PROCEDURES WHICH ARE TRANSLATION INVARIANT.
Technical rept.,
Michigan State Univ East Lansing Dept of Statistics
Shian-Koong Perng. 31 Aug 67, 44p Rept no. TR-16, RM-192
Contract Nonr-2587 (02)

Descriptors: (*Statistical processes, Invariance), Sampling, Distribution functions, Transformations (Mathematics), Theses, Theorems, Inequalities.

The purpose of this thesis is to try to show that certain moment conditions are essential for the admissibility of various 'good' translation invariant statistical procedures. Section 3 indicates the inadmissibility of a unique best translation invariant estimate if a certain moment condition fails to be satisfied. Section 4 and 5 shows, by example, the inadmissibility of a best translation invariant test if either the test is non-unique or certain moment conditions fail to hold. Section 6 shows, by example, that a certain translation invariant confidence interval is inadmissible if a certain moment condition fails to hold.
AD-657 463 HC$3.00 MF$0.65

TABLES OF TWO-SIDED TOLERANCE FACTORS FOR NORMAL DISTRIBUTIONS.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A. G. Benedict, and R. G. Chamberlain. 15 Jun 65, 14p NASA-CR-87306, JPL-TM-33-217
Contract NAS7-100

Descriptors: *Normal distribution, *Table, *Tolerance, Computer, Confidence, Distribution, Factor, Level, Normal, Pressure, Program.

For abstract, see STAR 05 19.
N67-32975 HC$3.00 MF$0.65

SELECTION OF THE SPECTRUM OF THE LEGENDRE POLYNOMS APPROXIMATING THE OBSERVED SQ-FIELD.
Academy of Sciences (USSR), Moscow. Soviet Geophysical Committee.
A. D. Bazarzhapov, and V. M. Mishin. 1966, 8p
Refs (See N67-33667 19-13)

Descriptors: *Geomagnetic field, *Legendre polynomial, Application, Approximation, Choice, Coefficient, Error, Field, Function, Geomagnetic, Igy, Magnetic, Minimization, Network, Optimal, Series, Spectrum, Spherical, Square, Station, U.S.S.R..

For abstract, see STAR 05 19.
N67-33669 HC$3.00 MF$0.65

SMOOTHING BY MEANS OF FUNCTIONS ANALOGOUS TO SPLINE FUNCTIONS.
Lissage Par Utilisation de Fonctions Analogues Aux Fonctions Spline
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
C. Ferrand. 1967, 19p ONERA-TP-463/1967/
in French, English Summary Presented At the 6th F.I.R.O. Congr., Nancy, France, 22-24 May 1967

Descriptors: *Functional analysis, *Smoothing, *Spline function, *Vector analysis, Analogy, Analysis, Calculus, Curve, Data, Formula, Function, Functional, Hilbert space, Interpolation, Linear, Vector.

For abstract, see STAR 05 19.
N67-33854 HC$3.00 MF$0.65

REMARKS ON ESTIMATION PROBLEMS FOR THE PARAMETERS OF THE NEYMAN TYPE A DISTRIBUTION,
Oak Ridge National Lab., Tenn.
K. O. Bowman, and L. R. Shenton. May 67, 62p

Descriptors: (*Statistical analysis, *Statistical distributions), (*Asymptotic series, *Sampling).

For abstract, see NSA 21 16.
ORNL-4102 HC$3.00 MF$0.65

12B. Operations Research

MATHEMATICAL PROGRAMMING.
Systems research memo.,
Northwestern Univ Evanston Ill Technological Inst
Anthony V. Fiacco. Jun 67, 31p Rept no. SRM-178
Contracts Nonr-1228 (10), DA-31-124-ARO (D)-322
Prepared in cooperation with Research Analysis Corp., McLean, Va.

Descriptors: (*Mathematical programming, Sequential analysis), Algorithms, Convergence, Theorems, Dynamic programming.
Identifiers: Convex programming, Minimization.

Our objective is to provide a more general theoretical basis for those methods for solving constrained minimization problems that are based on successive unconstrained minimizations of a parametric auxiliary function. In order to do this, we first give basic defining properties of a general auxiliary function and obtain a proof of local convergence for the mildly regulated nonconvex problem. We proceed from this general result to develop a family of auxiliary functions by giving the general function more and more structure, eventually being led to the general form of the 'penalty' functions that conventionally have been utilized. Similarly, the problem structure is increasingly specialized and we deal finally with the convex problem. As expected, stronger results are obtained as additional structure is assumed. (Author)
AD-656 904 HC$3.00 MF$0.65

GENERATION AND APPROXIMATION OF REACH AND DISTRIBUTION OF FREQUENCIES.
Systems research memo.,
Northwestern Univ Evanston Ill Technological Inst
Abraham Charnes, William W. Cooper, James K. DeVoe, D. B. Learner, and Walter Reinecke. 14 Feb 67, 15p Rept no. SRM-171
Contracts Nonr-1228 (10), DA-31-124-ARO (D)-322

Descriptors: (*Linear programming, *Management planning), (*Scheduling, Management planning), Mathematical models, Simulation, Decision theory, Operations research.

Media planning has heretofore been restricted, by and large, only to the consideration of average frequency. A recently developed mathematical model explicitly considers both cumulative duplicating audiences over a variety of time periods and the simultaneous selection and scheduling of media. This model thus required the development of methods for handling such nonlinear concave aspects of audience characteristics within a linear programming model and for generating distribution of frequency data within the computational processes of the model. This is done by means of logarithmic transformations and, for the discrete distributions of frequencies, by log-normal approximating devices. Each of these two techniques is important in its own right as a type of method which may be employed in a wide variety of modelling or computational situations. Thus, because neither of these techniques is restricted to the area of media planning per se it seemed worthwhile to present them on their own terms--as in the present paper--instead of treating them only as a detail in developing and interpreting the LPII model.
AD-656 905 HC$3.00 MF$0.65

THE CURRENT STATE OF CHANCE-CONSTRAINED PROGRAMMING.
Systems research memo.,
Northwestern Univ Evanston Ill Technological Inst
Michael J. L. Kirby. 1967, 30p Rept no. SRM-181
Contract Nonr-1228 (10), Grant NSF-GP-7550
Prepared in cooperation with Dalhousie Univ., Halifax (Nova Scotia). Presented at the International Symposium on Mathematical Programming, Princeton Univ., N. J., 15 Aug 67.

Descriptors: (*Decision theory, *Management planning), (*Management engineering, *Mathematical programming), Mathematical models, Random variables, Probability, Optimization, Theorems, Economics.
Identifiers: Chance-constrained programming.

This paper presents a survey of chance-constrained programming results and applications. It begins with a detailed discussion of the basic concepts involved in chance-constrained programming. This discussion is followed by a summary of results which have been established for a variety of chance-constrained models. Then a survey of applications is considered. Here the applicability of chance-constrained models to problems in financial planning and competitive decision making is emphasized.
AD-656 907 HC$3.00 MF$0.65

OPTIMAL INVESTMENT AND CONSUMPTION STRATEGIES UNDER RISK, AND UNCERTAIN LIFETIME, AND INSURANCE.
California Univ Los Angeles Western Management Science Inst
Nils H. Hakansson. Jun 67, 46p Rept no. WMSI Working Paper-119
Contract Nonr-233 (75)
Research supported in part by NSF.

Descriptors: (*Decision theory, Probability), (*Dynamic programming, Uncertainty), Random variables, Operations research, Management planning, Mathematical models, Optimization, Economics.
Identifiers: Utility functions, Insurance business.

In a previous paper, the author presented a normative model of the individual's economic decision problem under risk. This model is now extended to include the case in which the individual has an uncertain life-time, a bequest motive, and the opportunity to enter into contracts of insurance. Optimal investment and consumption strategies are derived, where possible, for the class of utility functions whose proportional risk aversion indices are constants, and their properties are noted. In consequence of one of these properties, it is shown that the model gives rise to an induced theory of the firm under risk, which may be viewed as an extension of the theory developed for the case in which the horizon is certain. In addition, it is found that when the premium charged is 'fair,' any given individual may be able to make himself better off both by the purchase of insurance on his own life and the sale of insurance on the lives of others. (Author)
AD-657 034 HC$3.00 MF$0.65

AN INVESTIGATION OF SEQUENTIAL SEARCH ALGORITHMS.
Final rept. 15 Apr-31 Dec 66,
Operations Research Inc Silver Spring Md
H. Beiman, and H. Eisner. Jan 67, 88p Rept no. TM-103-67
ESD-TR-67-222
Contract AF 19 (628)-5989

Descriptors: (*Search theory, Algorithms), (*Information theory, Search theory), (*Decision theory, Mathematical programming), Dynamic programming, Coding, Linear programming, Probability, Decision making.
Identifiers: Sequential search.

Characterizations of sequential search processes and algorithms are developed. Representative sequential search algorithms are reviewed and interpreted within the framework of these characterizations in several fields including equipment diagnosis, signal encoding, radar systems, coin weighing, and human decision processes. Conclusions and recommendations for application are presented. Appendixes include selected mathematical techniques in programming and information theoretic search procedures, analyses of scoring systems, and a bibliography. (Author)
AD-657 050 HC$3.00 MF$0.65

THE BEHAVIOR OF A SIMPLE QUEUE AT VARIOUS TIMES AND EPOCHS.
Revised ed.,
New York Univ N Y Dept of Industrial Engineering and Operations Research
Irwin Greenberg. 3 Jan 66, 18p
AFOSR-67-1882
Grant AF-AFOSR-62-153
Revision of manuscript submitted 9 Apr 65.
Availability: Published in SIAM Review v9 n2 p234-48 Apr 1967.

Descriptors: (*Queueing theory, Optimization), Operations research, Random variables, Probability density functions, Bessel functions, Theorems.
Identifiers: Maximum likelihood.

This paper concerns an investigation of maximum likelihood estimation of the parameters of a simple queue. The relative merits of several strategies for determining how long the observation of the queue will continue are examined: A - the total observation time is fixed B - busy period of server is fixed C - number of arrivals is fixed D - number of departures is fixed E - number of events (arrivals plus departures) is fixed. It is found that strategy A is optimum based on the criterion of expected observation time required to achieve a given asymptotic precision of the estimates of the relevant parameters. (Author)
AD-657 054 Not available from CFSTI.

THE STRUCTURE OF UTILITY FUNCTIONS.
Technical rept.,
Stanford Univ Calif Inst for Mathematical Studies in the Social Sciences
William M. Gorman. 1 Aug 67, 63p Rept no. TR-151
Contract Nonr-225 (50)

Descriptors: (*Decision theory, Management planning), Sequences, Convergence, Transformations (Mathematics), Graphics, Theorems, Inequalities.
Identifiers: Utility functions.

A continuous complete preference ordering is defined on an arcconnected, topologically separable product space S = S1xS2x..xSn. Call 1...n sectors and say that a set A of sectors is separable if the conditional ordering on A, given what happens off it, is independent of the latter, essential if it matters what happens on A, at least sometimes, and strictly essential if it always does. It is shown how to determine the structure of the utility function, given a collection of separable sets, when each sector is strictly essential. Various examples are discussed, an alternative approach sketched, and, finally, the requirement of strict essentiality replaced by the basically nugatory condition that each sector be essential. The results can, of course, be applied to other functions, too. (Author)
AD-657 126 HC$3.00 MF$0.65

A HEURISTIC COMPROMISE BETWEEN PROBABILITY OF SUCCESS AND LIMITED RESOURCES.
Research paper,
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
Murray Turoff. Aug 67, 43p Rept no. RP-P-338
IDA/HQ-67-6135
Contract DAHC15-67-C-0011

Descriptors: (*Decision theory, Mathematical models), Effectiveness, Management planning, Probability, Uncertainty, Economics, Costs, Optimization.
Identifiers: Utility functions, Density functions.

This paper proposes an analytical technique for modeling by the analyst of a particular decision situation. Evidence supporting the basic proposal, properties of the technique, discussions of its possible applications, and examples are also presented. The basic problem is a compromise between the probability of success in a single trial versus the total expected number of successes over many trials under the constraint of a limited and uncertain resource. The analogous situation of choosing an operating point for a system which is a compromise between the effectiveness of the system and its efficiency (effectiveness divided by cost) is also discussed. (Author)
AD-657 168 HC$3.00 MF$0.65

QUANTITATIVE METHODS IN COMPUTER-DIRECTED TEACHING SYSTEMS.
Stanford Univ Calif Inst in Engineering-Economic Systems
For primary bibliographic entry see Field 5I.
AD-657 190 HC$3.00 MF$0.65

ON SOME SEQUENCING PROBLEMS.
Research rept.,
Carnegie Inst of Tech Pittsburgh Pa Graduate School of Industrial Admistration
Wlodzimierz Szwarc. Jul 67, 44p Rept no. RR-103
TT-67-62700
Contract Nonr-760 (24)
Trans. of Przeglad Statystyczny (Poland) v9 n4 p367-82 1962: v10 n1 p139-54 1963.

Descriptors: (*Production control, *Scheduling), Optimization, Approximation (Mathematics), Linear programming, Graphics, Operations research, Theorems, Management planning.

The (mxn) sequencing problem may be characterized as follows: There are m machines which can produce a piece consisting of n parts. Each part has a determined order in which it is processed through the machines. It is assumed that each machine cannot deal with more than one part at a time and that the processing required for each part can be accomplished only on one machine. The problem is to find the best production plan consisting in sequencing the different parts so as to make the whole amount of time from the beginning of work till the piece is completed the shortest possible. Such a plan is called an optimum one. In the first 4 sections of this paper, the problem (2xn) is solved for the (2xn) case in which the order in which parts come on the machine is not constrained by futher assumptions. The remainder of the paper then takes up: i, the (3xn) problem of Bellman-Johnson (viz. the technological processing order through the machine is the same for all parts), for several new special cases; ii, the 2xn problem of sequencing when delay times must also be considered; and, iii, some properties of an approximating method for solving (mxn) problems including a delineation of cases when the approximating method will yield optimal solutions. (Author)
AD-657 193 HC$3.00 MF$0.65

THE KERNAL AND BARGAINING SET FOR CONVEX GAMES,
Rand Corp Santa Monica Calif
M. Maschler, B. Peleg, and L. S. Shapley. Aug 67, 25p Rept no. RM-5372-PR
Contract F44620-67-C-0045

Descriptors: (*Game theory, *Bargaining), Behavior, Optimization, Theorems, Operations research.

In game theory, a convex game is a competitive situation characterized by increasing marginal utility for coalition membership as coalitions grow larger. The core of any n-person game is the set of outcomes that cannot profitably be blocked by a coalition. For the case of convex games, two other solution concepts--the kernel and the bargaining set--prove to be closely related to the core. The kernel lies in the relative interior of the core, and the bargaining set coincides with the core. RM-4571-PR, which introduced the convex game, showed that the core is similarly related to two other solution concepts: the value solution is the

center of gravity of the extreme points of the core, and the Von Neumann-Morgenstern stable set solution coincides with the core. (Author)
AD-657 332 HC$3.00 MF$0.65

FOURIER ANALYSIS OF THE WEISS-HERMAN TRAFFIC EQUATION,
Naval Weapons Center China Lake Calif
Roy Leipnik. Aug 67, 16p Rept no. NWC-TP-4395
Availability: Published in Transpn Res v1 p67-74 1967.

Descriptors: (*Traffic, Mathematical models), Integral transforms, Fourier analysis, Velocity, Motion, Dynamics.
Identifiers: Traffic equation.

The nonlinear integral equation of Weiss and Herman for the position distribution at any time t, given the velocity distribution and position distribution at time 0, of cars, whose passing is unimpeded, on an infinitely long highway is converted to a quadratic relation between the Fourier transform of the various distributions. A general solution is then reached by Hermite expansion, and a number of specific closed-form solutions are obtained for a unit source (parking lot) and a uniform source. (Author)
AD-657 421 Not available from CFSTI.

AN ALGORITHM FOR FINDING A MINIMUM EQUIVALENT GRAPH OF A DIGRAPH.
Research rept.,
Carnegie Inst of Tech Pittsburgh Pa Management Sciences Research Group
Dennis M. Moyles, and Gerald L. Thompson. Jul 67, 13p Rept no. RR-107
Contract Nonr-760 (24)

Descriptors: (*Algorithms, *Graphics), (*Numerical analysis, Sequences), Theorems, Set theory, Matrix algebra, Problem solving, Mathematical logic, Operations research, Sequential analysis, Mathematics.

A directed graph or digraph can be thought of as a communication network among a set of persons, where the vertices of the graph correspond to persons and edges of the graph to directed channels of communication from one person to another. A person is said to be able to 'reach' another if he can send a message to that person. The present paper gives an algorithm for finding the maximum number of edges that can be removed from a digraph without affecting its reachability properties. (Author)
AD-657 428 HC$3.00 MF$0.65

ON THE APPLICATION OF THE THEORY OF MAXIMUM PRINCIPLE TO A PRODUCTION CONTROL PROBLEM.
Research rept.,
Carnegie Inst of Tech Pittsburgh Pa Management Sciences Research Group
R. Jagannathan. Aug 67, 14p Rept no. RR-108
Contract Nonr-760 (24)

Descriptors: (*Production control, Operations research), Scheduling, Optimization, Management planning, Costs, Inventory control.
Identifiers: Maximum principle.

The purpose of this paper is to solve a simple production control problem using the maximum principle theory as put forward by L. S. Pontryagin and his students. In the first section entitled 'Introduction,' a brief description of maximum principle theory as relevant to our purpose is given. In the second section the production scheduling problem under probabilistic demand (which occurs periodically) is developed. The problem is a fairly realistic one resulting in a somewhat complicated analysis. In the final section the possibilities of relaxation of some of the underlying assumptions are indicated. (Author)
AD-657 430 HC$3.00 MF$0.65

A NOTE ON SOME STOCHASTIC APPROACHES TO NONSTOCHASTIC DISCRETE PROGRAMMING.
Research rept.,
Carnegie Inst of Tech Pittsburgh Pa Management Sciences Research Group
Fred Glover. Aug 67, 16p Rept no. RR-111
Contract Nonr-760 (24)

Descriptors: (*Linear programming, Stochastic processes), Theorems, Matrix algebra, Probability, Inequalities, Optimization, Operations research.

Some ways are proposed for assigning 'best' probabilities to the values assumed by the variables of a deterministic integer linear programming problem. Our results, which can be used in the framework of the Reiter and Rice discrete optimization procedure and the Graves and Whinston confidence level procedure, also give meaningful conditional probabilities and suggest other stochastic approaches to discrete linear programming. (Author)
AD-657 431 HC$3.00 MF$0.65

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

CRYOGENIC HEAT PIPE.
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20M.
AD-657 025 HC$3.00 MF$0.65

INTERFACIAL FACTORS IN EVAPORATOR SURFACE FOULING: A STATE-OF-THE-ART SURVEY.
Research and development rept.,
Navy Marine Engineering Lab Annapolis Md
B. H. Rankin, and J. A. Bauman. Mar 67, 35p Rept no. MEL-24/67

Descriptors: (*Evaporators, Fouling), Interfaces, Surfaces, State-of-the-art reviews, Scale, Nucleation, Boiling, Fluids, Physical chemistry.

A survey of the literature was made to determine the state of the art in understanding the mechanism of evaporator-scale formation. The use of bulk conditions for the fluid and the heating surface does not provide a reasonably accurate model of the problem. Exploration of the variables in the interface region should provide a logical and more fruitful approach. Experimental examination of these interface variables must be made under precisely controlled conditions. Bench scale experiments are under way to establish the effects of surface material composition and roughness on scaling characteristics. (Author)
AD-657 127 HC$3.00 MF$0.65

CONSIDERATION IN THE DESIGN OF LOW PRESSURE GAS BURNERS,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Robert Fristrom, and Spencer Raezer. 9 Jul 67, 10p Rept no. CF-2553
Contract NOrd-7386

Descriptors: (*Heating elements, Gases), Design, Flames, Gas flow, Stability.

The main factors affecting the stability of the flame are gas composition, jet velocity, and pressure. These must be maintained constant to 0.1% to obtain reasonable resolution. (A drift in the flame front of plus or minus 0.03mm was considered tolerable.) In addition, one must consider the effects of turbulence, drafts, convection currents, oscillations in the burner chamber and pipes, and flow instability in the flame itself. After considerable trial and error, a burner system was devised which met the requirements. It will maintain a flame whose front remains so fixed that its image can be held in the cross hairs of a thirty power telemicroscope with no visible excursions over periods of several minutes. It is simple in design and construction and has many advantages from the standpoint of operation. The critical requirements of the apparatus was discussed under the headings: (1) pressure regulation, (2) flow regulation, (3) control of drafts and convection currents, (4) suppression of oscillations, (5) suppression of turbulence and flame instability.
AD-657 145 HC$3.00 MF$0.65

TEST OF TRUCK, 3/4 TON, IMPROVED INSULATED AMBULANCE.
Army Medical Research Lab Fort Knox Ky
For primary bibliographic entry see Field 13F.
AD-657 229 HC$3.00 MF$0.65

13B. Civil Engineering

DETERMINATION OF FREE CHLORINE BY METHYL ORANGE,
Illinois State Water Survey Urbana
For primary bibliographic entry see Field 7B.
AD-656 816 Not available from CFSTI.

FIELD EXPEDIENTS FOR DECONTAMINATING WATER CONTAINING NUCLEAR BOMB DEBRIS,
Army Engineer Research and Development Labs Fort Belvoir Va
For primary bibliographic entry see Field 18H.
AD-656 930 HC$3.00 MF$0.65

APPROACH ROADS, GREENLAND 1960-1964.
Technical rept.,
Cold Regions Research and Engineering Lab Hanover N H
Robert Davis. Jun 67, 52p Rept no. CRREL-TR-133

Descriptors: (*Roads, Greenland), Ice, Terrain, Climatology, Design, Snow removal, Ablation, Temperature, Glaciers, Construction.

Project 1, Approach Roads, Greenland R+D Program, was organized in 1954 to develop methods, techniques and criteria for constructing roads on both glacial ice surfaces and adjacent ice-free terrain. This report covers activities for the years 1960 through 1964, which consisted primarily of an annual assessment of the performance of the various roads and other structures on the ice cap. Emphasis is placed on climate; design, construction and performance of the new ramp road; performance of past construction; ice surface movement; subsurface temperature measurements; and the use of snow fences to reduce ablation. (Author)
AD-657 261 HC$3.00 MF$0.65

APPLICATIONS OF THE SOLID AND LIQUID STATE CONCEPTS FOR MACROMERITIC LIQUIDS.
Final rept. 3 Jan 66-2 Feb 67,
Bell Helicopter Co Fort Worth Tex Electronics Dept
Hans F. Winterkorn. 30 Jun 67, 52p Rept no. Soil Eng Research Ser-9
AFCRL-67-0414
Contract AF 19 (628)-5805

Descriptors: (*Soil mechanics, Phase studies), (*Construction materials, Phase studies), Particles, Liquids, Shear stresses, Sand, Earthquakes, Drainage, Permeability, Porosity, Concrete, Mechanical properties.
Identifiers: Macromeritic systems.

The development of the concept of the 'liquid' and 'solid' states of large-particle (macromeritic) systems is traced briefly, and the consequences with respect to the shear resistance of such systems are pointed out. Subsequently, insights gained by the macromeritic systems theory and practical applications are treated with special reference to: (1) liquefaction of loose natural sand strata by earthquake shock energy, (2) optimization of strength and permeability of granular drainage structures, (3) stabilization of granular soil systems, (4) granular backfill materials for special purposes, (5) Bearing capacity of granular systems, (6) consideration of porosity, internal surface and capillary phenomena in graded granular systems. The report concludes with a synoptic picture of the present state of knowledge on the structure and properties at different bulk densities of a macromeritic monocomponent system of essentially spherical particle shape. (Author)
AD-657 335 HC$3.00 MF$0.65

PRINCIPLES OF GEOCRYOLOGY (PERMAFROST STUDIES). PART II. ENGINEERING GEOCRYOLOGY. CHAPTER XIII. NEW AND IMMEDIATE PROBLEMS IN ENGINEERING GEOCRYOLOGY.
National Research Council of Canada, Ottawa (Ontario).
N. I. Saltykov. 1967, 17p NRC-TT-1276, TT-67-62059
Transl. Into English From the Russian

Descriptors: *Cold weather, *Frost, *Structural foundation, *Thermal property, Control, Foundation, Ground, Interaction, Maintenance, Mechanical, Permafrost, Principle, Property, Region, Rock, Structural, Thermal.

For abstract, see STAR 05 19.
N67-33281 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

STUDY OF THE MECHANICS OF SLIDE DAMS WITH SAND MODELS,
Michigan Technological Univ., Houghton. Dept. of Civil Engineering.
George A. Young. Apr 67, 107p
Contract AT (29-1)-789

Descriptors: (*Dams, Civil engineering), (*Terrain models, Particle size), Cratering, Velocity, Density, Impact.

For abstract, see NSA 21 16.
SC-RR-67-24 HC$3.00 MF$0.65

13C. Construction Equipment Materials, and Supplies

ENCYCLOPEDIA OF CONTEMPORARY ENGINEERING. STRUCTURAL MATERIALS. PART I. ABLATION THRU CORDS.
Foreign Technology Div Wright-Patterson AFB Ohio
12 Apr 67, 962p Rept no. FTD-TT-66-22-Pt-1 TT-67-62675
Contract AF 33 (657)-14184
Trans. from mono. Entsiklopediya Sovremennoi Tekhniki. Konstruktsionnye Materialy, Vol. 1-3, Moscow, 1965. See also Part II, AD-657 257; Part III, AD-657 258; Part IV, AD-657 259; Part V, AD-657 260.

Descriptors: (*Construction materials, Handbooks), Structural parts, Materials, Mechanical properties, Physical properties, Processing, Quality control, Non-destructive testing, Dictionaries, USSR.
Identifiers: Encyclopedias.

The encyclopedia includes survey articles on the most important properties of heat-resistant, antiscaling, magnetic, semiconductor, corrosion-resistant, thermoacoustically insulating and other materials that are of greatest interest to workers in industry. An extensive section is devoted to modern testing and nondestructive quality-control methods for materials. Treatment of theoretical problems in physical metallurgy and material behavior in general is held to the necessary minimum; those interested in these problems are referred to the bibliographies given at the end of each article. Production processes are discussed only to the extent that they affect the properties of the materials. (Author)
AD-657 256 HC$3.00 MF$0.65

ENCYCLOPEDIA OF CONTEMPORARY ENGINEERING. STRUCTURAL MATERIALS. PART II. CORROSION FATIGUE THRU HASTELLOY.
Foreign Technology Div Wright-Patterson AFB Ohio
12 Apr 67, 744p Rept no. FTD-TT-66-22-Pt-2 TT-67-62676
Contract AF 33 (657)-14184
Trans. from mono. Entsiklopediya Sovremennoi Tekhniki. Konstruktsionnye Materialy, Vol. 1-3, Moscow, 1965. See also Part I, AD-657 256; Part III, AD-657 258; Part IV, AD-657 259; Part V, AD-657 260.

Descriptors: (*Construction materials, *Handbooks), Structural parts, Materials, Mechanical properties, Physical properties, Quality control, Non-destructive testing, Processing, Dictionaries, USSR.
IdentifiersEncyclopedias.

The encyclopedia includes survey articles on the most important properties of heat-resistant, antiscaling, magnetic, semiconductor, corrosion-resistant, thermoacoustically insulating and other materials that are of greatest interest to workers in industry. An extensive section is devoted to modern testing and nondestructive quality-control methods for materials. Treatment of theoretical problems in physical metallurgy and material behavior in general is held to the necessary minimum; those interested in these problems are referred to the bibliographies given at the end of each article. Production processes are discussed only to the extent that they affect the properties of the materials. (Author)
AD-657 257 HC$3.00 MF$0.65

ENCYCLOPEDIA OF CONTEMPORARY ENGINEERING. STRUCTURAL MATERIALS. PART III. HEAT AND SOUND INSULATING LOOSE FIBER MATERIALS THRU NICHROME.
Foreign Technology Div Wright-Patterson AFB Ohio
12 Apr 67, 898p Rept no. FTD-TT-66-22-Pt-3 TT-67-62677
Contract AF 33 (657)-14184
Trans. from mono. Entsiklopediya Sovremennoi Tekhniki. Konstruktsionnye Materialy, Vol. 1-3, Moscow, 1965. See also Part I, AD-657 256; Part II, AD-657 257; Part IV, AD-657 259; Part V, AD-657 260.

Descriptors: (*Construction materials, *Handbooks), Structural parts, Materials, Mechanical properties, Physical properties, Quality control, Non-destructive testing, Processing, Dictionaries, USSR.
Identifiers: Encyclopedias.

The encyclopedia includes survey articles on the most important properties of heat-resistant, antiscaling, magnetic, semiconductor, corrosion-resistant, thermoacoustically insulating and other materials that are of greatest interest to workers in industry. An extensive section is devoted to modern testing and nondestructive quality-control methods for materials. Treatment of theoretical problems in physical metallurgy and material behavior in general is held to the necessary minimum; those interested in these problems are referred to the bibliographies given at the end of each article. Production processes are discussed only to the extent that they affect the properties of the materials. (Author)
AD-657 258 HC$3.00 MF$0.65

ENCYCLOPEDIA OF CONTEMPORARY ENGINEERING. STRUCTURAL MATERIALS. PART IV. NICKEL THRU SOFT MAGNETIC MATERIALS.
Foreign Technology Div Wright-Patterson AFB Ohio
12 Apr 67, 939p Rept no. FTD-TT-66-22-Pt-4 TT-67-62678
Contract AF 33 (657)-14184
Trans. from mono. Entsiklopediya Sovremennoi Tekhniki. Konstruktsionnye Materialy, Vol. 1-3, Moscow, 1965. See also Part I, AD-657 256; Part II, AD-657 257; Part III, AD-657 258; Part V, AD-657 260.

Descriptors: (*Construction materials, *Handbooks), Structural parts, Materials, Mechanical properties, Physical properties, Processing, Quality control, Non-destructive testing. Dictionaires, USSR.
Identifiers: Encyclopedias.

The encyclopedia includes survey articles on the most important properties of heat-resistant, antiscaling, magnetic, semiconductor, corrosion-resistant, thermoacoustically insulating and other materials that are of greatest interest to workers in industry. An extensive section is devoted to modern testing and nondestructive quality-control methods for materials. Treatment of theoretical problems in physical metallurgy and material behavior in general is held to the necessary minimum; those interested in these problems are referred to the bibliographies given at the end of each article. Production processes are discussed only to the extent that they affect the properties of the materials. (Author)
AD-657 259 HC$3.00 MF$0.65

ENCYCLOPEDIA OF CONTEMPORARY ENGINEERING. STRUCTURAL MATERIALS. PART V. SOLDER THRU ZIRCON.
Foreign Technology Div Wright-Patterson AFB Ohio
12 Apr 67, 921p Rept no. FTD-TT-66-22-Pt-5

TT-67-62679
Contract AF 33 (657)-14184
Trans. from mono. Entsiklopediya Sovremennoi Tekhniki. Konstruktsionnye Materialy, Vol. 1-3, Moscow, 1965. See also Part I, AD-657 256; Part II, AD-657 257; Part III, AD-657 258; Part IV, AD-657 259.

Descriptors: (*Construction materials, *Handbooks), Structural parts, Materials, Mechanical properties, Physical properties, Processing, Quality control, Non-destructive testing, Dictionaries, USSR.
Identifiers: Encyclopedias.

The encyclopedia includes survey articles on the most important properties of heat-resistant, antiscaling, magnetic, semiconductor, corrosion-resistant, thermoacoustically insulating and other materials that are of greatest interest to workers in industry. An extensive section is devoted to modern testing and nondestructive quality-control methods for materials. Treatment of theoretical problems in physical metallurgy and material behavior in general is held to the necessary minimum; those interested in these problems are referred to the bibliographies given at the end of each article. Production processes are discussed only to the extent that they affect the properties of the materials. (Author)
AD-657 260 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

13D. Containers and Packaging

OPTIMUM THICKNESS TRANSITIONS FOR CYLINDRICAL PRESSURE VESSELS WITH HEMISPHERICAL HEADS.
Revised ed.,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
E. Y. Tsui, and. Bruce Burns. 6 Mar 67, 4p
Revision of manuscript received 11 Oct 66.
Availability: Published in Journal of Spacecraft and Rockets v4 n6 p716-9 Jun 1967.

Descriptors: (*Pressure vessels, Thickness), Cylindrical bodies. Configuration, Differential equations, Structural shells, Loading (Mechanics).

An analysis is presented for two new thickness transition configurations for cylindrical pressure vessels with hemispherical heads. These configurations, which extend on both sides of the juncture between the shells, are the versine variation and the bilinear variation. The bilinear transition is shown to result in lighter designs while holding overstress to a negligible amount. Nondimensional curves are presented which show the over-all vessel weight for both types of transition. Results are obtained by solving numerically a system of second-order differential equations applicable to thin elastic isotropic shells of variable thickness, using an established decoupling criterion for spherical and cylindrical shells under edge loads. (Author)
AD-657 080 Not available from CFSTI.

NEUTRON MULTIPLICATION EXPERIMENT WITH 238 PU DIOXIDE DOUBLE SEALED IN CALORIMETER PRESSURE CONTAINERS,
Mound Lab., Miamisburg, Ohio.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 16.
MLM-1395 HC$3.00 MF$0.65

13E. Couplings, Fittings, Fasteners, and Joints

REPORT ON AN INVESTIGATION OF BRITTLE NUGGETS IN SPOT WELDS OF TITANIUM WITH OTHER METALS, ESPECIALLY STAINLESS STEEL,
Texas Univ Austin Defense Research Lab
E. H. Bucknall. 30 May 57, 41p Rept no. DRL-403
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab., CF-2644.

Descriptors: (*Spot welds, Titanium alloys), Stainless steel, Brittleness, Spot welding, Reviews, Welding, Metals, Alloys.

The investigation comprised a microscopical study of spot welds made between titanium and stainless steel (and some other metals), together with a survey of the literature with the hope of finding an explanation of the brittle weld nuggets encountered. The outstanding features of the brittle spot welds were: (1) Melting had largely, if not wholly, been concentrated in the titanium and while melted titanium had penetrated into the stainless steel (or other second metal) no evidence of the reverse action was seen. (2) The nugget metal had evidently been very mobile, which suggested that it was not a high-melting point intermetallic compound. (3) The general etching behavior and cracking mode of the nugget metal suggested that it might well be titanium which had been embrittled by absorption of an interstitial element by diffusion and most probably was alpha-titanium stabilized by oxygen. If titanium is to be welded successfully to other metals such as stainless steel, special techniques need development. Possible means include welding to an easily deoxidized intermediary. Aluminum and magnesium appear generally not to be recommended because of their low melting temperatures. Silver recommends itself because of its auto-deoxidation characteristics. Iron thoroughly deoxidized, using first mild deoxidants and then excess of magnesium or calcium silicide should serve equally and would have the additional advantage of discouraging alpha stabilization, even if oxygen still reached the titanium in dangerous amounts. (Author)
AD-657 137 HC$3.00 MF$0.65

STRESS RELAXATION IN AERONAUTICAL FASTENERS.
Final rept.,
National Bureau of Standards Washington D C
Nixon Halsey, John H. Gieske, and Leonard Mordfin. Feb 67, 34p Rept no. NBS-9485

Descriptors: (*Mechanical fasteners, *Stress relieving), (*Locking fastener devices, Iron alloys), (*Bolts, Iron alloys), Stresses, Creep, Test equipment, Test methods, Heat-resistant metals + alloys.

Creep and stress relaxation tests at 1200F were carried out on A-286 alloy material specimens and bolt-and-nut combinations. Details of the testing equipment and procedures are described and several recommendations, in these areas, are made for use in the establishment of a standard stress relaxation test method. Some of the experimental stress relaxation data are compared with calculated values which were developed from the experimental creep data by the application of the strain hardening and time hardening principles. The usefulness of this technique is discussed. (Author)
AD-657 338 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

13F. Ground Transportation Equipment

TEST OF TRUCK, 3/4 TON, IMPROVED INSULATED AMBULANCE.
Final rept.
Army Medical Research Lab Fort Knox Ky
12 Jun 43, 14p

Descriptors: (*Ambulances, Thermal insulation), Temperature, Desert tests, Heat tolerance, Cooling + ventilating equipment.

Under static conditions, the application of improved insulation to ambulance walls does not reduce interior air temperatures to desirable levels. In hot climates, reduction of temperature within the ambulance to an acceptable level for comfort of occupants requires the use of mechanical refrigeration. Wall insulation is desirable in order to keep the size of the cooling equipment at a minimum. The excess temperature within an ambulance over that of the outside air can be kept at a minimum if adequate wall insulation is employed in conjunction with forced ventilation. (Author)
AD-657 229 HC$3.00 MF$0.65

13G. Hydraulic and Pneumatic Equipment

FLUIDIC AC AMPLIFIERS.
Final rept. Apr 66-May 67,
Bowles Engineering Corp Silver Spring Md
Larry R. Moore, James J. Zaloudek, Jr., and Robert F. Turek. Jun 67, 120p Rept no. BEC-R-6-28-67
Contract DA-49-186-AMC-325 (D)

Descriptors: (*Fluid amplifiers, Alternating current), Fluidics, Design, Amplifiers, Circuits, Feasibility studies.

Several fluidic tuned AC Amplifiers were designed and tested. Interstage tuning and feedback designs are considered. Good results were obtained with vented flow amplifiers using interstage tuning. Sin-

gle stage elements demonstrated gains as high as 35 db at resonance (600 to 1300 hz) with corresponding Q's as high as 12. Element designs and test results of one, two, and three stage amplifiers are presented. AC Modulated Carrier Systems offer potential advantages over DC amplifiers which include higher gain per stage, lower drift and better noise rejection. To achieve this, high gain, narrow-band amplifiers are required. It is concluded that fluidic amplifiers with low impedance characteristics are necessary. (Author)
AD-656 934 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

13H. Industrial Processes

ON SOME SEQUENCING PROBLEMS.
Carnegie Inst of Tech Pittsburgh Pa Graduate School of Industrial Administration
For primary bibliographic entry see Field 12B.
AD-657 193 HC$3.00 MF$0.65

SURFACES AND INTERFACES IN MATERIALS TECHNOLOGY.
Martin Co Baltimore Md Research Inst for Advanced Studies
For primary bibliographic entry see Field 11G.
AD-657 380 HC$3.00 MF$0.65

ON THE APPLICATION OF THE THEORY OF MAXIMUM PRINCIPLE TO A PRODUCTION CONTROL PROBLEM.
Carnegie Inst of Tech Pittsburgh Pa Management Sciences Research Group
For primary bibliographic entry see Field 12B.
AD-657 430 HC$3.00 MF$0.65

COLD PRESSING AND SINTERING OF RARE EARTH OXIDES,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 11C.
For abstract, see NSA 21 16.
BNWL-386 HC$3.00 MF$0.65

MAGNETIC FORCE WELDING APPLICATIONS AT BATTELLE NORTHWEST,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
R. F. Boolen. May 67, 18p
Contract AT (45-1)-1830

Descriptors: (*Welding, Electrical industry), (*Electromagnets, *Forging).

For abstract, see NSA 21 16.
BNWL-422 HC$3.00 MF$0.65

NUMERICAL TREATMENT OF A THIN PLATE HEAT TRANSFER PROBLEM,
Oak Ridge Gaseous Diffusion Plant, Tenn.
G. W. Stewart, and Dale W. Lick. 31 May 67, 18p
Contract W-7405-eng-26

Descriptors: (*Metal plates, *Heat transfer), Equations, Approximation (Mathematics), Iterative methods.

For abstract, see NSA 21 16.
K-1695 HC$3.00 MF$0.65

STUDY OF DEVELOPMENT OF SATURN MANUFACTURING TECHNOLOGY FOR WELDING METHODS AND TECHNIQUES TO REDUCE HYDROGEN POROSITY FINAL REPORT, 25 FEB. - 24 SEP. 1966.
Southern Research Inst., Birmingham, Ala. Metallurgy Div.
A. C. Willhelm. 28 Oct 66, 58p NASA-CR-87304, REPT.-8086-1806-VII
Contract NAS8-20307

Descriptors: *Gas welding, *Hydrogen, *Porosity, *Saturn launch vehicle, Alloy, Aluminum, Fusion, Gas, Getter, Inert, Reduction, Saturn, Slurry, Spot, Welding.

For abstract, see STAR 05 19.
N67-32973 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

ANNUAL PROGRESS SUMMARY (ON URANIUM FABRICATION), 1966.
Reactive Metals, Inc., Ashtabula, Ohio.
For primary bibliographic entry see Field 18J.
For abstract, see NSA 21 16.
RMI-8 HC$3.00 MF$0.65

13I. Machinery and Tools

A STUDY OF THE HEAT GENERATION RATES AND TEMPERATURE DISTRIBUTION OF A PAIR OF BALL BEARINGS UNDER AXIAL LOAD.
Naval Ship Research and Development Center Annapolis Md Annapolis Div
For primary bibliographic entry see Field 20M.
AD-657 117 HC$3.00 MF$0.65

APPLICATION OF THE ANALYSIS OF VARIANCE TO MADIC DATA,
Naval Ship Research and Development Center Annapolis Md Annapolis Div
M. A. Cohen. Aug 67, 22p
NSRDC-2435

Descriptors: (*Noise, Analysis of variance), (*Machines, Sound), Acoustics, Computer programs, Programming languages, Noise analyzers, Submarine noise, Marine engineering, Nuclear propulsion, Naval research.
Identifiers: MADIC (Machinery acoustic data information center).

Mean noise levels of machinery noise data are dependent on several factors. Analysis-of-variance procedures are useful in determining which, if any, of the factors are of prime importance in causing significant deviations from the over-all mean level. This report describes how these procedures can be used as an aid in analyzing the data in the Machinery Acoustic Data Information Center (MADIC). An example which makes use of a computer program written in the COBOL language that has been developed for this purpose is demonstrated. (Author)
AD-657 128 HC$3.00 MF$0.65

ANALYTICAL TOOLS FOR THE DESIGN OF GAS BEARING WHEEL PACKAGES - A REPORT OF PROGRESS-.
Interim technical rept.,
Massachusetts Inst of Tech Cambridge Instrumentation Lab
William H. Keating. Dec 66, 46p Rept no. E-2091
Contract F04694-67-C-0028

Descriptors: (*Gas bearings, *Vehicle wheels), (*Design, Gas bearings), Stresses, Temperature, Rotation, Performance (Engineering), Torque, Analysis.

Predicted gas bearing stiffnesses are difficult to achieve and a lack of agreement between theory and test data is all too often attributed to inadequacies in the gas bearing theory. This report discusses how temperature, rotational forces, and interference fits affect the final shape and positioning of the bearing under operating conditions, which in turn affect the bearing stiffnesses and the resultant compliance torques. The report does not attempt to outline a program to be followed in the design of a particular gas bearing, since the proper attack depends on the nature of the design itself. However, the analytical techniques are presented to aid the designer in realistically optimizing and predicting the performance of gas bearings. (Author)
AD-657 319 HC$3.00 MF$0.65

REVIEW OF FAILURE MECHANISMS IN HIGHLY LOADED ROLLING AND SLIDING CONTACTS.
Technical rept.,
Mechanical Technology Inc Latham N Y
A. J. Smalley, S. F. Murray, H. Christensen, and H. S. Cheng. May 67, 83p Rept no. MTI-67TR23
Contract N00014-66-C-0037

Descriptors: (*Antifriction bearings, Failure (Mechanics)), (*Lubrication, Antifriction bearings), Loading (Mechanics), Hydrodynamics, Elasticity, Films.
Identifiers: Elastohydrodynamic lubrication.

The failure modes of fatigue and scoring in highly loaded contacts are analyzed. Existing theories by which their onset may be predicted are critically examined, and the relationship between these failure modes and the phenomenon of elastohydrodynamic lubrication is shown. The possible modifying influence of microelastohydrodynamic occurrences is pointed out and a method of analyzing such occurrences is proposed. The protecting influence of boundary lubrication effects is also demonstrated, and mechanisms for satisfactory performance and failure under the influence of this phenomenon are put forward. (Author)
AD-657 337 HC$3.00 MF$0.65

ANALYSIS, DESIGN, AND PROTOTYPE DEVELOPMENT OF SQUEEZE-FILM BEARINGS FOR AB-5 GYRO. PHASE IV - DEVELOPMENT OF A CONICAL-BEARING, AXIAL EXCURSION PROTOTYPE SUMMARY REPORT.
Mechanical Technology, Inc., Latham, N. Y.
F. K. Orcutt, and C. H. Pan. Apr 67, 44p NASA-CR-87280, MTI-67TR30
Contract NAS8-11678

Descriptors: *Bearing, *Gimbal, *Gyroscope, *Transducer, Amplitude, Axial, Axis, Excursion, Film, Load, Motion, Squeeze, Stiffness, Vibration.

For abstract, see STAR 05 19.
N67-33019 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

13J. Marine Engineering

MARINE CORROSION STUDIES: THE ELECTROCHEMICAL CHARACTERISTICS OF SEVERAL PROPRIETARY ALUMINUM GALVANICANODE MATERIALS IN SEA WATER.
Naval Research Lab Washington D C
For primary bibliographic entry see Field 11F.
AD-656 899 HC$3.00 MF$0.65

USS TRIPOLI (LPH-10) VIBRATION CHARACTERISTICS OF THE HOSPITAL AREA OBSERVED DURING UNDERWAY TRIALS,
Naval Ship Research and Development Center Washington D C Acoustics and Vibration Lab
E. F. Noonan, and S. E. Lee. Jun 67, 41p
NSRDC-2513

Descriptors: (*Landing craft, Hospitals), (*Ship decks, Vibration), Aircraft carriers, Helicopters, Medical equipment, Shipborne, Marine surface propulsion.

Underway vibration trials on USS TRIPOLI (LPH-10) were conducted on 17 and 18 April 1967. Measurements were concentrated on the hospital area. Data were analyzed to determine the vibration level on the medical equipments as a result of modifications made since the trials of September 1966. The results indicated no significant change in resonant frequency and amplitudes of vibration at the 01 deck, however, a general impression of improved characteristics was noted. Suggested recommendations in order to palliate the vibration problem in the hospital area are based on these and previous studies of the LPH Class. (Author)
AD-656 914 HC$3.00 MF$0.65

ALVIN, 6000-FT. SUBMERGENCE RESEARCH VEHICLE.
Technical rept.,
Woods Hole Oceanographic Institution Mass
James W. Mavor, Jr., Harold E. Froehlich, William M. Marquet, and William O. Rainnie, Jr. Nov 66, 34p Rept no. WHOI-Ref-67-42, WHOI-Contrib-1804
Contract Nonr-3483 (00)
Presented at the Annual Meeting of the Society of Naval Architects and Marine Engineers, New York, 10-11 Nov 66.
Availability: Published in The Society of Naval Architects and Marine Engineers n3 p1-32 1966.

Descriptors: (*Underwater vehicles, Design), Logistics, Performance (Engineering), Systems engineering, Buoyancy, Propulsion, Ballast, Batteries + components, Electric motors, Electric cables, Pressure, Life support, Control systems.
Identifiers: Alvin (Oceanographic research vessel).

Alvin, a deep-submergence oceanographic research submarine was commissioned on June 5, 1964, reached her designed operating depth of 6000 feet during trials in July, 1965, and maintained a deep-diving schedule in February and March, 1966. The vehicle, displacing 30,000 lb on an overall length of 22 ft, carries a payload of 1400 lb and a complement of one pilot and one or two observers. Five plexiglas windows and a mechanical arm permit observation, collection, and manipulative tasks. The design of Alvin is described in some detail and the lessons learned from operations over a two-year period are presented and discussed. The logistic support used with Alvin operations is described, including a seagoing catamaran built for the task. (Author)
AD-656 985 Not available from CFSTI.

APPLICATION OF THE ANALYSIS OF VARIANCE TO MADIC DATA,
Naval Ship Research and Development Center Annapolis Md Annapolis Div
For primary bibliographic entry see Field 13I.
AD-657 128 HC$3.00 MF$0.65

AIRBOAT NOISE REDUCTION AND IMPELLER DESIGN FOR WATER JET PROPULSION SYSTEMS.
Technical rept.,
Hydronautics Inc Laurel Md
Dinshaw N. Contractor, and J. Otto Scherer. Jul 67, 97p Rept no. TR-532-1
Contract Nonr-5018 (00)

Descriptors: (*Impellers, Design), (*Boats, Design), (*Propeller noise, Reduction), (*Jet propulsion, *Marine propulsion), Hydrojet engines, Model tests, Water, Shallow water, Propellers (Aerial), Shrouded propellers.
Identifiers: Airboats, Shallow draft boats.

The report deals with problems encountered in two different forms of propulsion used for shallow draft boats. The first part of the report describes the program undertaken to reduce the radiated noise levels around a boat propelled by means of an airscrew. A new propeller was designed to reduce the radiated noise while providing the same or higher thrust. A shroud was designed to reduce the propeller thrust loading and hence decrease the radiated noise level. An extensive series of noise and thrust performance tests was carried out, in which the number of blades and blade pitch were varied. The results of these tests indicated that the new propeller with 4 blades and a 14-degree pitch, operating in the shroud provided more thrust and was quieter than the original wooden propeller. The second part of the report concerns the design of impellers for use in water jet propulsion system for shallow draft boats. The impellers in a commercial water jet system used by the Army did not perform as anticipated. The report describes the design of a new impeller and guide vanes to replace those in the commercial unit. (Author)
AD-657 187 HC$3.00 MF$0.65

GRILLAGES UNDER NORMAL AND AXIAL LOADS.
Final rept. 1 Feb 66-30 Jun 67.
Lehigh Univ Bethlehem Pa Fritz Engineering Lab
26 Jul 67, 3p Rept no. 323.2
Contract NObs-94238

Descriptors: (*Ship structural components, *Supports), Loading (Mechanics), Stresses, Structural properties.

A survey of the literature dealing with the analysis and design of grillages under normal and axial loads was made. The survey showed that neither a completely satisfactory method for the working stress analysis nor a method for the ultimate strength analysis of grillages under combined normal and axial loads is yet available. It has been suggested that one of the discrete element methods, based on either the lumped parameter or finite element approach, be adapted for both the working stress and ultimate strength analysis of grillages under combined loads.
AD-657 211 HC$3.00 MF$0.65

AN ANALOG SIMULATION TO DETERMINE THE PERFORMANCE REQUIREMENTS OF THE DEPTH SIMULATION CONTROL SYSTEM OF THE SUBMARINE BALLAST BLOW TEST FACILITY.
Technical memo.,
Navy Marine Engineering Lab Annapolis Md
John L. Joynes, and R. J. Rutkowski. Mar 67, 46p Rept no. MEL-TM-333/66

Descriptors: (*Ballast, Removal), (*Submarine simulators, Control systems), Analog computers, Performance (Engineering), Simulation, Test facilities, Ballast tanks, Gas flow, Water.

A theoretical analysis for simulation on an analog computer was developed for the ballast blow simulation process and control system. The assumptions are an isentropic process and ideal gas behavior. The results of the computer study are expected to permit an evaluation of the proposed depth simulation control system and indicate any changes that may be required. (Author)
AD-657 295 HC$3.00 MF$0.65

USE OF LAGRANGIAN COORDINATES FOR SHIP WAVE RESISTANCE (FIRST- AND SECOND-ORDER THIN-SHIP THEORY).
Technical rept.,
California Univ Berkeley Coll of Engineering
John V. Wehausen. Jun 67, 41p Rept no. NA-67-4
Contract Nonr-3656 (17)

Descriptors: (*Ships, Hydrodynamics), Water waves, Motion, Drag, Functions, Integrals, Iterative methods, Approximation (Mathematics), Equations of motion.

The wave motion generated by the steady motion of a ship is formulated 'exactly' in Lagrangian coordinates. An approximation scheme is then developed based upon a method of iteration. The first iteration can be chosen so as to yield the Michell thin-ship theory. The second iteration produces more complicated formulas. However, if the smallness of draft/length is taken into account, the formula for the resistance simplifies to one similar to Michell's, but with the integral taken over a modified region and with a modified hull function, plus a line integral over the profile which represents a distribution of dipoles with strength proportional to the waterline slopes. (Author)
AD-657 315 HC$3.00 MF$0.65

CLOSED-CIRCUIT TELEVISION AS AN AID IN SHIP CONTROL,
Defence Research Medical Labs Toronto (Ontario)
For primary bibliographic entry see Field 17B.
AD-657 502 Not available from CFSTI.

APPLICATION OF THE LIFTING FOIL THEORY SOLVED BY RHEOELECTRIC ANALOGY TO THE CALCULATION AND DESIGN OF SUB AND SUPER CAVITATING PROPELLERS FINAL REPORT.
Bureau D Analyse Et de Recherche Appliquees, Boulogne-billancourt (France).
L. Malavard, and P. Sulmont. Mar 67, 53p AD-652981
Contract N62558-4998

Descriptors: *Hydrofoil, *Marine navigation, *Mathematical model, *Problem solving, *Propeller blade, *Supercavitating flow, Analog, Blade, Calculation, Computer, Design, Disturbance, Effect, Flow, Foil, France, Lifting, Marine, Mathematics, Method, Model, Navigation, Problem, Propeller, Slip, Solution, Subcavitation, Supercavitating, Tank, Test, Thickness, Thrust, Velocity.

For abstract, see STAR 05 19.
N67-32791 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

13K. Pumps, Filters, Pipes, Fittings, Tubing, and Valves

HYDRAULIC TRANSFER VALVE ANALYZER,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
D. D. Zimmerman. 3 Jul 57, 18p Rept no. CF-2658
Contract NOrd-7386

Descriptors: (*Hydraulic valves, Design), Acceleration, Instrumentation, Test equipment, Guided missiles, Test methods, Amplifiers.

The report is a detailed account of the design and operation of a tester for hydraulic amplifier type transfer valves. The design is so arranged that it will handle the normal linear valve and the new acceleration switching variety. The valve tester was originated because of the great difficulty experienced by Bendix/Mishawaka and APL in their procurement and testing of Moog transfer valves. A second motivation for the valve tester was the problem of defining what was wrong with a valve that failed in the missile during its normal checkout and MST. The actuators and instrumentation for measuring valve volumetric flow rates are designed to easily scale from large to small flow rate valves such as Talos wing servo and Terrier homing head valves respectively. (Author)
AD-657 157 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

13L. Safety Engineering

LIST OF LIBRARY ACCESSIONS, FFC-3927 TO FFC-4061.
Federal Fire Council Washington D C
21 Jul 67, 7p

Descriptors: (*Fire safety, Bibliographies), Reports.

The list indicates the latest publications accessioned into the Federal Fire Council's fire safety library.
AD-657 390 HC$3.00 MF$0.65

FLAMMABILITY PROPERTIES OF HYDROCARBON FUELS. PART 2. THE IMPORTANCE OF VOLATILE COMPONENTS AT LOW CONCENTRATION ON THE FLAMMABILITY OF LIQUID FUELS,
Naval Research Lab Washington D C
For primary bibliographic entry see Field 21D.
AD-657 455 HC$3.00 MF$0.65

13M. Structural Engineering

A RELAXATION PROCEDURE FOR COMPUTING STRESSES IN BUILT-UP STRUCTURES.
Royal Aircraft Establishment Farnborough (England)
For primary bibliographic entry see Field 20K.
AD-656 871 HC$3.00 MF$0.65

THERMAL STRESSES IN FINITE LENGTH SANDWICH CYLINDERS.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 20K.
AD-656 887 HC$3.00 MF$0.65

BUDGE ALLOCATION FOR SHELTER SYSTEMS.
Research Triangle Inst Durham N C Operations Research and Economics Div
For primary bibliographic entry see Field 5A.
AD-656 940 HC$3.00 MF$0.65

STRUCTURAL EFFICIENCY OF VARIOUS MATERIALS AT ELEVATED TEMPERATURES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 11F.
AD-657 110 HC$3.00 MF$0.65

INFLUENCE OF STRAIN-HARDENING AND STRAIN-RATE SENSITIVITY ON THE PERMANENT DEFORMATION OF IMPULSIVELY LOADED RIGID-PLASTIC BEAMS,
Brown Univ Providence R I Div of Engineering
Norman Jones. Jul 67, 47p
Contract SD-86

Descriptors: (*Beams (Structural), *Strain (Mechanics)), Deformation, Structures, Loading (Mechanics), Structural properties.

A simple method is presented for estimating the combined influence of strain-hardening and strain-rate sensitivity on the permanent deformation of rigid-plastic structures loaded dynamically. A study is made of the particular case of a beam supported at the ends by immovable frictionless pins and loaded with a uniform impulse. The results of this work indicates that considering strain-hardening alone when appropriate or strain-rate sensitivity alone gives permanent deformations which are similar to those predicted by an analysis retaining both effects simultaneously. (Author)
AD-657 129 HC$3.00 MF$0.65

PURE BENDING OF METAL HONEYCOMB PLATES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Manford B. Tate. May 56, 39p Rept no. CF2523
Contract NOrd-7386

Descriptors: (*Metal plates, Honeycomb cores), Bending, Stainless steel, Sandwich construction, Structural properties, Graphics, Stresses.

The report presents a general solution of the problem of the bending of a flat plate of metal honeycomb construction when it is subjected to constant bending moment. The solution is obtained from considerations of the physical requirement for displacement and strain continuity in the honeycomb core and face sheets. To simplify analysis, constant or average stresses were sought in preference to seeking the exact stress distribution in each part of the structure. This simplification leads to an approximate solution, but the approximation appears to be acceptable, as it is not likely to cause a serious discrepancy when the analysis is used in making design estimates, comparisons, and selections. There are further advantages, too, in the savings of analytical and computational time and labor that are gained by using the shortened analysis. Two numerical examples are worked out, one employing a honeycomb with hexagonal cells and the second having square cells. In these two particular examples, the only variation between them being in the cell shape, a superiority of 3.54 to 1 is found for the square-cell plate, where 3.54 is calculated as the ratio of the strength-weight ratios of the two plates. A graphical procedure for the rapid and efficient determination of stress coefficients is also used and described. (Author)
AD-657 147 HC$3.00 MF$0.65

A PRACTICAL SOLUTION TO THE PROBLEM OF THERMAL BENDING IN SPACECRAFT EXTENDIBLE BOOMS.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
D. W. Rabenhorst. Jun 67, 65p Rept no. TG-915
Contract NOw-62-0604

Descriptors: (*Extendable structures, Spacecraft components), (*Thermal insulation, Extendable structures), Bending, Shielding, Solar radiation, Compatibility, Effectiveness, Foils, Configuration, Design, Polyester plastics, Aluminum coatings.

The report considers solutions for the problem of protecting spacecraft extendible booms from thermal bending in sunlight. It was theorized that such protection could be achieved by devising a sunshield that would fit around the boom like a shroud, and that thermal bending would thus be reduced by orders of magnitude. However, no designs that would provide the desired protection and at the same time maintain compatibility between the boom and the boom-erection equipment were forthcoming and work on the sunshield was abandoned. This report describes a series of sunshield configurations that satisfy the compatibility requirements and have the following characteristics: Stowed Volume - < 2 cu in/100 ft; Weight - Less than 2 oz/100 ft; Projected Area Deployed - 2-3 times that of the bare boom; Deployment - Automatic - no extra equipment required; Retraction and Redeployment - Automatic - no extra equipment required; Thermal Improvement Over Bare Boom - Greater than 1000%.
AD-657 154 Not available from CFSTI.

METHODS OF REDUCING THE SIZE AND NUMBER OF VOIDS ON FORMED CONCRETE SURFACES.
Technical rept.,
Army Engineer Waterways Experiment Station Vicksburg Miss
B. J. Houston. Jul 67, 36p Rept no. TR-6-788
Availability: Hard copy available from Army Engineer Waterways Experiment Station, Vicksburg, Miss., $0.75.

Descriptors: (*Concrete, Defects (Materials)), Surfaces, Inhibition, Coatings, Vibration.

An investigation was conducted to determine the cause of surface voids on formed concrete surfaces and to study methods of reducing their size and number. Form-coating materials were tested on both vertical and overhanging metal and wood forms to determine their effectiveness in reducing surface voids. The results indicate that (a) amount of vibration of a concrete mixture affects the incidence of surface voids; (b) voids on vertical surfaces can be reduced to an acceptable level by sufficient vibration, but this is not true for sloping surfaces; (c) slick, smooth form coatings may be beneficial in some cases in reducing surface voids on concrete surfaces but their influence is small compared with other factors influencing voids such as consolidation of concrete into forms and variations between concrete batches; and (d) concrete bonding inhibitors are not effective in reducing voids. (Author)
AD-657 215 MF$0.65

RESPONSE OF CYLINDRICAL SANDWICH SHELLS TO MOVING LOADS.
Revised ed.,
Northwestern Univ Evanston Ill Dept of Civil Engineering
G. Herrmann, and E. H. Baker. 18 Mar 66, 7p
AFOSR-67-1925
Grant AF-AFOSR-100-65
Prepared for presentation at the Winter Annual Meeting of the American Society of Mechanical Engineers, New York, N. Y., Nov 27-Dec 1, 1966. Revision of manuscript submitted 18 Mar 66. Prepared in cooperation with North American Aviation Inc., Downey, Calif.
Availability: Published in Journal of Applied Mechanics p81-6 Mar 1967.

Descriptors: (*Structural shells, Sandwich construction), (*Loading (Mechanics), Structural shells), Structural properties, Dynamics, Cylindrical bodies, Stresses.

The paper presents an analysis into the dynamic response of a long cylindrical sandwich shell under a moving axially symmetric ring load. The shell is assumed to be orthotropic and subjected to an initial axial stress. The uniform velocity of the load is prescribed and only the steady-state response is considered. Numerical results indicate the effects of various relevant parameters. The behavior of orthotropic sandwich cylinders under initial stress is compared with that of homogeneous isotropic cylindrical shells free of initial stress, and differences are pointed out. (Author)
AD-657 423 Not available from CFSTI.

TRANSIENT RESPONSE OF AN ELASTIC SHELL IN PLANE STRAIN,
Northwestern Univ Evanston Ill Dept of Civil Engineering
For primary bibliographic entry see Field 20N.
AD-657 427 Not available from CFSTI.

MECHANICAL FORCE GENERATORS USING PERMANENT MAGNETS.
Generateurs de Forces Mecaniques A Aimants Permanents
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux. J.-F. Boisseau. 1967, 16p ONERA-TP-443/1967/
in French Presented At the 3d Perm. Magnets Days, Paris, 23-24 Feb. 1967, Sponsored By Chambre Syndicale des Producteurs D'aciers Fins Et Speciaux and Soc. Franc. des Electriciens

Descriptors: *Generator, *Mechanical property, *Structural vibration, Alternating, Coil, Conference, Current, Magnet, Mechanical, Permanent, Property, Structural, Vibration.

For abstract, see STAR 05 19.
N67-33338 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

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14. METHODS AND EQUIPMENT

14A. Cost Effectiveness

REVIEW OF THE ECONOMIC FEASIBILITY REPORT FOR THE SST AND SUPPORTING MATERIALS.
Charles River Associates Inc Cambridge Mass
For primary bibliographic entry see Field 1C.
AD-656 935 HC$3.00 MF$0.65

A SUPPLEMENTARY GUIDE FOR CONCEPT FORMULATION STUDIES,
Stanford Univ Calif Graduate School of Business
For primary bibliographic entry see Field 5A.
AD-657 033 HC$3.00 MF$0.65

TACTICAL SUPPORT TRANSPORT AIRCRAFT STUDY.
Marine Corps Washington D C
For primary bibliographic entry see Field 1C.
AD-657 195 HC$3.00 MF$0.65

ELEMENTS OF DESIGN REVIEW FOR SPACE SYSTEMS.
National Aeronautics and Space Administration, Washington, D. C.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 19.
N67-33400 HC$3.00 MF$0.65

14B. Laboratories, Test Facilities, and Test Equipment

SPEECH COMMUNICATION INDEX METER: FURTHER APPLICATIONS AND IMPROVEMENTS.
Bolt Beranek and Newman Inc Cambridge Mass
For primary bibliographic entry see Field 17B.
AD-656 788 HC$3.00 MF$0.65

LIMITS ON MINIMUM-SPEED V/STOL WIND-TUNNEL TESTS.
Revised ed.,
Washington Univ Seattle
William H. Rae, Jr. 31 Jan 67, 10p
AROD-4506:2-E
Grant DA-ARO(D)-31-124-G481
Revision of manuscript submitted 30 Sep 66. Presented at the AIAA Aerodynamic Testing Conference, Los Angeles, Calif., 21-23 Sep 66, Preprint 66-736.
Availability: Published in Journal of Aircraft v4 n3 p249-54 May-June 1967.

Descriptors: (*Rotary wings, Model tests), Wind tunnel models, Short take-off planes, Wind tunnels, Accuracy, Simulation, Downwash, Geometric forms, Jet flaps.

The paper presents the results of a systematic series of wind-tunnel tests, which have determined the maximum size rotor that can be tested in closed-throat wind tunnels both as a function of the downwash angle and as a function of tunnel geometry. For a given size rotor and tunnel there appears to be a maximum value of downwash that can be tolerated. If this value of downwash is exceeded, the flow through the wind tunnel is no longer similar to the flow that would be encountered in free flight but rather represents a flow similar to recirculation. The point at which the maximum downwash is reached is called the flow breakdown point. Similar results have also been obtained using jet flaps and jet-lift models. It is also shown that this flow breakdown is a function of tunnel geometry and that the allowable downwash angles are different for rectangular tunnels with width-to-height ratios of W/H = 1.50, 1.00, 0.67, and 0.50. Th eaddition of fillets to the test section is also shown to have an adverse effect on the allowable downwash angle. At the present time, the optimum tunnel configuration for rotors and other types of V/STOL vehicles is not known. (Author)
AD-656 810 Not available from CFSTI.

RESEARCH LABORATORY OF ELECTRONICS QUARTERLY PROGRESS REPORT NO. 86, JULY 15, 1967,
Massachusetts Inst of Tech Cambridge Research Lab of Electrocs
For primary bibliographic entry see Field 20I.
AD-656 868 HC$3.00 MF$0.65

WATER COOLING COMBUSTION GASES FOR CUBICLE 3 EXHAUST CHAMBER,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
S. E. Matthews, and C. R. Walton. 13 Feb 57, 22p Rept no. CF-2619
Contract NOrd-7386

Descriptors: (*Exhaust gases, Cooling), (*Combustion products, Cooling), Borohydrides, Combustion, Test facilities, Sprays, Water, Smokes, Removal.

A report is given of studies involving the design of a water spray spider to be used for cooling exhaust gases in a borohydride fuel combustion test facility.
AD-656 884 HC$3.00 MF$0.65

A GROUND FLUTTER SIMULATOR,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
J. P. Kearns. 23 May 57, 14p Rept no. CF-2647
Contract NOrd-7386

Descriptors: (*Flutter simulators, Design), Flutter, Mathematical anysis, Aeroelasticity, Aerodynamic loading.

The purpose of the report is to propose a technique for ground testing by a simulation of flutter.
AD-656 885 HC$3.00 MF$0.65

THE DESIGN AND TESTING OF AN ALL-LENS SCHLIEREN SYSTEM.

Texas Univ Austin Defense Research Lab
For primary bibliographic entry see Field 14E.
AD-656 886 HC$3.00 MF$0.65

AN X-RAY TELEVISION SYSTEM FOR ELECTRONICS PARTS INSPECTION.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Donald B. Gilmore, and Francis T. Marcellino.
Jul 67, 45p Rept no. TG-920
Contract NOw-62-0604

Descriptors: (*Non-destructive testing, X-ray photography), (*X-ray photography, *Television communication systems), Television cameras, Vidicons, X rays, Television display systems, Reliability (Electronics).

The report describes an X-ray television system for use in inspection and evaluation of electronic parts. This type of system offers several advantages over a conventional (two view, film) X-ray inspection system including: (1) The part may be translated, rotated, or tilted while being inspected. This allows an infinite number of views, lessening the chance of a defect going undiscovered. (2) Electro-mechanical parts, such as relays or switches, may be operated while being viewed. (3) The system may be adjusted for optimum resolution of the part structure, or of any suspected defect, while the device is being viewed. No waiting for film development and evaluation is required. The ability of the system to resolve details of the internal structure of electronic parts compares favorably with that of fine-grain film X-ray techniques. The X-ray television system is being used for incoming inspection, failure analysis, comparative evaluation of parts from different vendors, and evaluation of the effects of environmental tests on parts. Photographic examples of these various uses are included in this report. The report also discusses the advantages and limitations of X-ray television as an inspection tool and describes the X-ray television inspection system installation. (Author)
AD-656 892 HC$3.00 MF$0.65

WIND TUNNEL FREE-FLIGHT TESTING TECHNIQUES FOR PLANAR MOTION EMPLOYED AT THE NAVAL ORDNANCE LABORATORY,
Naval Ordnance Lab White Oak Md
Algrid P. Leonas, and Frank J. Regan. 3 May 67, 91p Rept no. NOLTR-67-69, Aerodynamics Resear-279

Descriptors: (*Flight testing, Test methods), Wind tunnels, Aerodynamic characteristics, Motion, Test equipment, Wind tunnel models, Data processing systems, Standardization.

The report is a summary of the planar motion free-flight testing techniques and procedures employed at the Naval Ordnance Laboratory, White Oak, Maryland. It is intended primarily to aid in standardizing the testing procedure and as a guide for further development in this field. (Author)
AD-656 903 HC$3.00 MF$0.65

GUIDANCE FOR SPECIFYING ENVIRONMENTAL TEST REQUIREMENTS OF ARMY CALIBRATING EQUIPMENT.
Technical note,
Frankford Arsenal Philadelphia Pa Quality Assurance Directorate
Vernon G. Ames. Aug 67, 10p
FA-TN-1120

Descriptors: (*Environmental tests, Test equipment (Electronics)), Calibration, Specifications, Test methods, Costs, Army procurement, Military requirements.

The document is intended to give technical guidance to those persons responsible for specifications, procurement and tests of Army calibrating equipment. It will be concerned with acquainting responsible people with the various parameters that should be specified in order that proper environmental tests can be conducted. (Author)
AD-656 929 HC$3.00 MF$0.65

PRODUCTION OF ULTRAHIGH VACUUM BY FLASHED GETTERS,
Aerospace Research Labs Wright-Patterson AFB Ohio
A. G. Jackson, and T. W. Haas. 23 Jun 66, 5p
Rept no. ARL-67-0075
Availability: Published in The Journal of Vacuum Science and Technology v4 n1 p42-3 Jan/Feb 1967.

Descriptors: (*Vacuum pumps, Materials), Metal films, Effectiveness, Vapor pressure, Evaporation, Adsorption.
Identifiers: Ion getters.

The use of getters to produce vacuums is not a new technique. Much of the work in this field, however, has not been with ultrahigh vacuum (uhv) in mind. For a laboratory uhv system certain criteria must be met, and possible getters are discussed with these criteria in mind. Experimental results on the most promising materials are given. (Author)
AD-656 950 Not available from CFSTI.

THE SPECTRAL REFLECTANCE OF WATER AND CARBON DIOXIDE CRYODEPOSITS FROM 0.36 TO 1.15 MICRONS.
Arnold Engineering Development Center Arnold Air Force Station Tenn
For primary bibliraphic entry see Field 20F.
AD-657 018 HC$3.00 MF$0.65

CRYOGENIC HEAT PIPE.
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio
For primary bibliographic entry see eld 20M.
AD-657 025 HC$3.00 MF$0.65

THE FRANK J. SEILER RESEARCH LABORATORY,
Frank J Seiler Research Lab United States Air Force Academy Colo
Gage H. Crocker. Jul 67, 58p
See also AD-641 986.

Descriptors: (*Laboratories, Reviews), (*Air force research, Reviews), Systems engineering, Computer programs, Control systems, Aerodynamics, Chemistry, Bibliographies, Scientific personnel.

The document constitutes an annual report and review for the fiscal year 1967. Topics include: organization and management of the laboratory papers published and technical reports issued; research underway or completed in the Chemistry Division, Aerospace Mechanics Division, and Computer Division; biographical sketches of staff members; major equipment on hand.
AD-657 036 HC$3.00 MF$0.65

A STANDING-WAVE METHOD FOR THE MICROWAVE EVALUATION OF DIELECTRIC AND MAGNETIC MATERIALS.
Progress rept. 15 Sep 65-15 Jun 66,
Massachusetts Inst of Tech Lexington Lincoln Lab
Jerald A. Weiss, and Emil R. Straka. 15 Jul 66, 35p
ESD-TR-67-465
Contract AF 19 (628)-5167
Prepared in cooperation with Worcester Polytechnic Inst., Mass. Dept. of Physics.

Descriptors: (*Ceramic materials, Test methods), (*Ferromagnetic materials, Test methods), (*Dielectrics, Test methods), Garnet, Alumina, Probes, Microwave frequency, Microwave equipment, Materials, Acceptability, S band, Standing wave ratios, Cavity resonators.

The report presents results of an investigation into the standing-wave method for evaluation of microwave loss and effective dielectric constant of low-loss ceramic materials. The objective of the study was primarily to devise a sensitive method for determination of the dependence of loss on the magnetic state of ferrites and ferrimagnetic garnets in various conditions of remanence. Design of a special coaxial slotted line and specimen holder is described. Preparation of specimens, including metallization of surfaces, is discussed. Data taken at S-band (approx. 3 GHz) on a dielectric and garnet material are presented. They show that the sensitivity of the method in its present form is marginal for the purpose, although within an order of magnitude of that of conventional resonant-cavity methods. A means for accurately determining a correction for distributed loss in the slotted line is presented. The report includes graphs of the theoretical voltage ratio (1/VSWR) versus electrical length of the specimen, for low-loss material having dielectric constants in the range 8 – 16, together with the computer program used to calculate these graphs. (Author)
AD-657 055 HC$3.00 MF$0.65

ULTRASONIC FLOW MEASUREMENT.
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
1967, 5p
Availability: Published in Instruments and Control Systems 5p nd Mar 1967.

Descriptors: (*Flowmeters, *Ultrasonic radiation), Measurement, Operation.

Applications of the ultrasonic flowmeter are as follows: (1) large flows which are difficult, if not impossible, to measure by existing techniques, (2) improved accuracy of readout over a wide range of flow conditions, (3) insensitivity to process condition changes such as viscosity, temperature, composition and pressure (including surges), (4) rapid response of flow variations (0.001 sec or faster), (5) where obstruction to flow is not permissible. Additional information is available for use during the normal operation of the meter such as the ability to automatically detect changes in composition, temperature or, any parameter that changes the speed of sound in the medium. This feature is applicable in such work as determining the interface in multiproduct pipelines and for accurate temperature indication in single product lines. (Author)
AD-657 076 Not available from CFSTI.

THE PHILOSOPHY OF VIBRATION TESTING,
American Chain and Cable Co Inc Detroit Mich
For primary bibliographic entry see Field 20K.
AD-657 111 HC$3.00 MF$0.65

THE MACH NUMBER AND TEMPERATURE CALIBRATION OF AN AXISYMMETRIC, INTERMITTENT-FLOW SUPERSONIC WIND TUNNEL,
Texas Univ Austin Defense Research Lab
Martin McDermott Bretting. Jun 57, 61p Rept no. DRL-396
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab. CF-2604.

Descriptors: (*Supersonic wind tunnels, Calibration), Mach number, Temperature, Axially symmetric flow, Supersonic characteristics, Pressure, Stagnation point.

Static pressure and temperature surveys were conducted in the 4.5-inch diameter, axisymmetric, intermittent-flow, supersonic wind tunnel to determine the flow characteristics. Both horizontal and vertical surveys were made at nine stations along the center line one inch apart. The static pressures were measured using Statham pressure transducers. The maximum M number variation was plus or minus 0.02 for the upstream part of the test

section and plus or minus 0.03 for the downstream part. An axial Mach number gradient of 0.012 per inch was found. There was no evidence of a focussing conical shock wave in the core of the test section. A five-probe, shielded-thermocouple type, temperature rake measured stagnation temperatures in the test section. The maximum temperature variation across the test section was 0.66 percent of the absolute stagnation temperature. (Author)
AD-657 133 HC$3.00 MF$0.65

THE DESIGN OF AN ACCELERATION INSENSITIVE SKIN FRICTION BALANCE FOR USE IN FREE FLIGHT VEHICLES,
Texas Univ Austin Defense Research Lab
Willis Carson Lyons, Jr. Jun 57, 67p Rept no. DRL-397
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab. CF-2605.

Descriptors: (*Balances, *Skin friction), Free flight trajectories, Acceleration, Design, Sounding rockets, Supersonic flight, Aircraft, Flight testing.

It was deemed that the acceleration insensitive skin friction balance is suitable for use in a free flight vehicle for the purpose of measuring local skin friction.
AD-657 135 HC$3.00 MF$0.65

INTERFERENCE EFFECTS DUE TO RELATIVE PROXIMITY OF STATIC-PRESSURE PROBES IN SUPERSONIC FLOW,
Texas Univ Austin Defense Research Lab
J. L. Lindsey. Jun 57, 53p Rept no. DRL-395
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab., CF-2603.

Descriptors: (*Pressure gages, Supersonic wind tunnels), Interference, Statics, Supersonic flow, Orifices.

An experimental investigation was conducted in a supersonic wind tunnel to determine the minimum critical spacing for no mutual interference of two cone-cylinder-type static-pressure probes designed for simultaneous pressure measurement in supersonic flow. Tests made over a Mach Number range of approximately 1.9 through 3.4 indicate that the minimum critical spacing is predominately a function of Mach Number and static-orifice location. Probe cone-angle and probe diameter variations produce minor effects. A theoretical study of static-orifice location was also made. Results indicate that the generally recommended position of six to ten probe diameters aft of the cone shoulder is suitable for pressure measurement at Mach Numbers as high as approximately 3.5; however, higher velocities require static-orifice locations at greater distances from the cone shoulder. (Author)
AD-657 139 HC$3.00 MF$0.65

THE VALIDITY OF THE SINGLE DEGREE OF FREEDOM SYSTEM ANALOG FOR VIBRATION ANALYSIS,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 20K.
AD-657 142 HC$3.00 MF$0.65

SERVO VOLTMETER,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Vincent Caggiano. 31 May 56, 13p Rept no. CF-2525
Contract NOrd-7386

Descriptors: (*Voltmeters, Servomechanisms), Servo amplifiers, Direct current.

The servo voltmeter is an instrument with capabilities of measuring any DC voltage between the limits of zero and one hundred (plus or minus .01) volts at any point. The input impedance is in the order of magnitude of two megohms. The servo voltmeter is basically very simple in that it is merely the summing of the unknown voltage, DC (f), and a portion of a standard DC voltage of opposite polarity, called reference voltage, picked off the variable arm of a potentiometer (called reference voltage pot or follow up pot). The result of this sum, the error voltage, is then fed to a servo amplifier whose output in turn operates a servo motor which drives, through a suitable gear train, a direct reading dial and the reference voltage potentiometer arm. As the output of the reference voltage pot approaches DC (f) the error voltage decreases, and when the output of the reference voltage pot equals DC (f), the error voltage is zero. At this point of zero error voltage the system is nulled at the point corresponding to the value of DC (f) which can then be read off the dial. In order that the polarity of the reference voltage be opposite to that of DC (f), both plus and minus are available, and an automatic, self-synchronizing selector chooses the correct polarity for an arbitrary input.
AD-657 148 HC$3.00 MF$0.65

MEASUREMENT OF THE DISSIPATION ASSOCIATED WITH THE ELECTROMECHANICAL COUPLING IN PIEZOELECTRIC CERAMICS.
Navy Underwater Sound Lab New London Conn
For primary bibliographic entry see Field 11B.
AD-657 169 HC$3.00 MF$0.65

ON MENARD INSERTS IN SUPERSONIC NOZZLES.
Technical rept.,
Michigan Univ Ann Arbor Office of Research Administration
J. L. Amick, S. A. Harrington, and H. P. Liepman. May 57, 11p Rept no. 2451:2-3-T
Contract NOrd-16595
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab., CF-2656.

Descriptors: (*Supersonic nozzles, *Nozzle inserts), Mach number, Effectiveness, Economics, Two-dimensional flow, Wind tunnel nozzles.

Menard inserts are an effective and economical means of increasing the Mach number of an existing two-dimensional nozzle. At low Mach numbers (around 1.5), increments of up to 10 percent of the basic Mach number can be achieved without loss in flow uniformity. The design of inserts for the low Mach number range can be carried out by a modified area-ratio theory. In most cases no model tests will be needed. At high Mach numbers above 2¼ increments in Mach number due to inserts will be less than 10 percent, and some deterioration of the uniformity of the flow must be anticipated. The design of inserts for the high Mach number regime should be substantiated by model tests, especially in the case of large increment inserts in short nozzles. (Author)
AD-657 177 HC$3.00 MF$0.65

CALIBRATION AND USE OF AN ELECTRON MICROSCOPE FOR PRECISION MICRO-MEASUREMENTS IN THIN FILM MATERIALS,
Pennsylvania State Univ University Park Materials Research Lab
For primary bibliographic entry see Field 20L.
AD-657 243 Not available from CFSTI.

THE RANDLE CLIFF RADAR DIGITAL RANGE-MEASURING INSTRUMENT.
Naval Research Lab Washington D C
For primary bibliographic entry see Field 17I.
AD-657 306 HC$3.00 MF$0.65

TRACE ANALYSIS OF SOLIDS BY MASS SPECTROMETRY.
Final scientific rept. 1 Apr 66-30 Jun 67,
RCA Labs Princeton N J
Richard E. Honig. Jul 67, 79p
AFCRL-67-0451
Contract AF 19 (628)-5106

Descriptors: (*Mass spectroscopy, Metals), (*Powder metals, Mass spectroscopy), (*Electrodes, Mass spectroscopy), Dielectrics, Wire, Surfaces, Binders, Materials, Impurities, Microanalysis, Gold, Silver, Photographic plates, Sensitivity, Ion sources, Evaporation, Lasers, Computer programs, Quantitative analysis.

To improve the mass spectrometric analysis of insulating solids in powder form and of surfaces, a broad-based project was undertaken to evaluate and select suitable metallic powders and wires of highest purity. Thirty-six samples obtained from nine suppliers were analyzed in nearly 180 separate runs in considerable detail. At this time, the cleanest materials of general usefulness are gold and silver in powder and wire form, the sum total of all bulk impurities amounting to less than 10 ppm atomic. Work was continued on ion-sensitive thin-film plates, but so far no method was found that yields plates of sufficient sensitivity without heating the substrate to 180C. Work in other areas, such as laser impact evaporation, revised computer program, and quantitative determination will be described briefly. (Author)
AD-657 334 HC$3.00 MF$0.65

STRESS RELAXATION IN AERONAUTICAL FASTENERS.
National Bureau of Standards Washington D C
For primary bibliographic entry see Field 13E.
AD-657 338 HC$3.00 MF$0.65

THE AIR FORCE MATERIALS LABORATORY TERMINAL BALLISTIC RESEARCH FACILITY.
Dayton Univ Ohio Research Inst
For primary bibliographic entry see Field 19D.
AD-657 378 HC$3.00 MF$0.65

SPECIFICATIONS FOR THE CASSEGRAIN INSTRUMENTS INCLUDING THE CASSEGRAIN OBSERVING PLATFORM, STEWARD OBSERVATORY 90-INCH TELESCOPE.
Arizona Univ Tucson Optical Sciences
For primary bibliographic entry see Field 3A.
AD-657 452 HC$3.00 MF$0.65

BASIC CHEMICAL RESEARCH IN AUSTRALIA,
Queensland Univ Brisbane (Australia) Dept of Chemistry
L. E. Lyons. 31 Jul 67, 9p
AFOSR-67-1923
Grant AF-AFOSR-863-65
Availability: Published in The Australian Journal of Science, v29 n11 p383-8 1967.

Descriptors: (*Australia, *Chemistry), Scientific research, Scientific organizations, Scientific personnel, Reports.

The paper is based on an address given by the author on his accession to the presidency of the Australian Chemical Society. It contains a survey of basic chemical research in Australian Universities and the C.S.I.R.O. and a look at the results against the background of the needs of Australia-in-Asia. There are several sets of tables which show the publications and the classification of the research papers in chemistry to date. Six specific proposals are made to assist in answering the problems outlined. A need is voiced for a Scientific Advisory Council composed of predominantly active scientists characterized by minds independent of scientific vested interests and likely to think of the welfare of Australia-in-Asia. (Author)
AD-657 475 Not available from CFSTI.

A MODIFICATION OF THE HOFFMAN-FLESHLER GRID SHOCK SCRAMBLER.
Antioch Coll Yellow Springs Ohio
James M. Campbell, and Harry J. Jerison. 1966, 4p
AFOSR-67-1950
Grant AF-AFOSR-150-66
Availability: Published in Journal of the Experimental Analysis of Behavior v9 n6 p689-90 Nov 1966.

Descriptors: (*Sequence switches, Circuits), (*Conditioned reflex, Instrumentation), Electric discharges, Timing devices, Voltage.
Identifiers: Shock scramblers.

A modification of the Hoffman-Flesher shock scrambler is described which incorporates a new cam-operated microswitch arrangement. The modification permits more accurate control of the shock voltage and recycle interval.
AD-657 483 Not available from CFSTI.

ASSEMBLY/STERILIZER FACILITY FEASIBILITY PROGRAM, VOLUME I FINAL REPORT.
General Electric Co., Philadelphia, Pa. Missile and Space Div.
21 Feb 67, 96p NASA-CR-66439, DOC.-67SD604, VOL. I
Contract NAS1-5381

Descriptors: *Clean room, *Spacecraft sterilization, Assembly, Bioassay, Checkout, Clean, Facility, Hardware, Microorganism, Operator, Performance, Repair, Room, Spacecraft, Sterilization, Tool.

For abstract, see STAR 05 19.
N67-32714 HC$3.00 MF$0.65

HYDROSTATIC PRESSURE TRANSDUCERS OF CARBON AND YTTERBIUM FINAL REPORT.
National Bureau of Standards, Boulder, Colo.
J. W. Dean, and R. J. Richards. 1 Mar 67, 28p
NASA-CR-87161, NBS-9285
NASA ORDER R-45

Descriptors: *Carbon, *Electric resistance, *Hydrostatic pressure, *Pressure transducer, *Ytterbium, Coefficient, Dynamic, Electric, Hydrostatic, Instrumentation, Measurement, Pressure, Resistance, Stability, Temperature, Transducer.

For abstract, see STAR 05 19.
N67-32740 HC$3.00 MF$0.65

BALANCED FILTERS FOR THE ANALYSIS OF AL, SI, K, CA, FE, AND NI.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
J. A. Dunne, and N. L. Nickle. 1 Aug 67, 14p
NASA-CR-87164, JPL-TR-32-1134
Contract NAS7-100

Descriptors: *Filter, *Planetary surface, *X-ray fluorescence, Aluminum, Analysis, Calcium, Diffraction, Dispersion, Electronic, Fluorescence, Height, Iron, Lunar, Nickel, Planetary, Potassium, Pulse, Silicon, Surface, X-ray.

For abstract, see STAR 05 19.
N67-33229 HC$3.00 MF$0.65

SAFETY ATTACHMENTS FOR X-RAY DIFFRACTION APPARATUS.
Atomic Weapons Research Establishment, Aldermaston (England).
P. G. Hambling, and C. F. Sampson. Feb 67, 16p
AWRE-O-102/66

Descriptors: *Diffractometer, *Safety device, *X-ray diffraction, Attachment, Camera, Device, Diffraction, Exposure, Ionizing, Powder, Protection, Radiation, Research, Safety, Shield, Teaching, X-ray.

For abstract, see STAR 05 19.
N67-33277 HC$3.00 MF$0.65

VOLTAGE STABILIZATIONS FOR HIGH TEMPERATURE FURNACE.
Commissariat A L Energie Atomique, Grenoble (France).
J. Huet. Oct 66, 10p CEA-R-3050
in French, English Summary

Descriptors: *Furnace, *Stabilizer, *Voltage regulator, Element, Heating, High temperature, Regulator, Servomotor, Static, Variation, Voltage.

For abstract, see STAR 05 19.
N67-33279 HC$3.00 MF$0.65

RECENT PROGRESS IN THE O.N.E.R.A. HOT-SHOT WIND-TUNNELS.
Progress Recents Dans les Souffleries A Arg de l'O.N.E.R.A
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
P. Carriere, and J.-P. Chevallier. 1967, 54p
ONERA-TP-447/1967/
in English and French Presented At 5th Symp. on Hypervelocity Tech., Denver, 16-17 Mar. 1967

Descriptors: *Arc chamber, *Facility, *Wind tunnel, Arc, Chamber, Conference, Flow, Gas, High temperature, Hot, Nozzle, Thermal, Tunnel, Wind.

For abstract, see STAR 05 19.
N67-33335 HC$3.00 MF$0.65

MECHANICAL FORCE GENERATORS USING PERMANENT MAGNETS.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 13M.
For abstract, see STAR 05 19.
N67-33338 HC$3.00 MF$0.65

DOUBLE-DRIVER SHOCK TUBE FOR SHOCK-ON-SHOCK SIMULATION.
Aeronautical Research Inst. of Sweden, Stockholm.
B. Lemcke. Dec 66, 90p FFA-109

Descriptors: *Blast loading, *Shock simulator, *Supersonic flow, *Tube, Blast, Double, Driver, Flow, Hemisphere, Interaction, Loading, Parameter, Performance, Reentry, Shock, Simulator, Supersonic, Test, Vehicle, Wave, Wedge.

For abstract, see STAR 05 19.
N67-33520 HC$3.00 MF$0.65

IONIZED-WAKE INVESTIGATION IN HOT-SHOT WIND- TUNNELS.
Utilisation des Souffleries A Arc Bref pour l'Etude des Sillages Ionises
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
D. Compard, and J. Dorey. 1967, 34p ONERA-TP-455/1967/
in French, English Summary Presented At the Agard Meeting on Plasmas in Wakes, Fort Collins, Colo., 10-12 May 1967

Descriptors: *Hotshot tunnel, *Hypersonic wake, *Ionized gas, *Wind tunnel apparatus, Apparatus, Density, Device, Electronic, Flow, Gas, Hotshot, Hypersonic, Ionized, Langmuir probe, Model, Nitrogen, Plasma, Scale, Shock, Temperature, Tunnel, Wake, Wind.

For abstract, see STAR 05 19.
N67-33641 HC$3.00 MF$0.65

APPLICATION OF GEBHART'S METHOD TO THE COMPUTATION OF RADIATIVE EXCHANGES INSIDE AN ENVIRONMENTAL CHAMBER.
European Space Technology Center, Noordwijk (Netherlands).
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 19.
N67-33643 HC$3.00 MF$0.65

THE DIGITAL DATA ACQUISITION SYSTEM FOR THE BIG SPACE SIMULATION CHAMBER OF THE INSTITUT FUER RAUMSIMULATION OF THE DVL.
Die Datenerfassungsanlage Fur Die Grosse Raumsimulationskammer des Instituts Fuer Raumsimulation Der Dvl
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Porz (West Germany). Institut Fuer Raumsimulation.
K. Kramp. May 67, 38p DLR-MITT.-67-08, DVL-647
in German, English Summary

Descriptors: *Data acquisition, *Digital data, *Space simulation, Acquisition, Data, Diagram, Digital, Measuring, Simulation, Space.

For abstract, see STAR 05 19.
N67-33722 HC$3.00 MF$0.65

THE HELIUM MAGNETOMETER.
Imperial Coll. of Science and Technology, London (England). Dept. of Geology.
M. J. Usher. 1966, 40p REPT.-1966/3
Sponsored By Brit. Natl. Comm. on Space Res.

Descriptors: *Helium, *Magnetometer, *Optical pumping, *Self-oscillation, Amplifier, Experiment, Optical, Oscillation, Probe, Pumping, Rocket, Satellite, Servomotor, Space.

For abstract, see STAR 05 19.
N67-33896 HC$3.00 MF$0.65

ELECTRONIC EQUIPMENT USED FOR LB RADIATION MEASUREMENT DURING A SPACE EXPERIMENT.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 17E.
For abstract, see STAR 05 19.
N67-33947 HC$3.00 MF$0.65

NEW SYSTEMS OF TRAJECTOGRAPHY.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 22D.
For abstract, see STAR 05 19.
N67-33959 HC$3.00 MF$0.65

AN AUTOMATIC THREE-DIMENSIONAL MODELS MEASURING MACHINE IN R.A.E. WORKSHOPS.
Royal Aircraft Establishment, Farnborough (England).
W. G. Bushell, E. H. Fewkes, and S. W. Potter. Jul 66, 25p RAE-TR-66229

Descriptors: *Aircraft model, *Automatic control, *Contour, *Mechanical engineering, *Numerical control, Aircraft, Analysis, Automatic, Control, Dimensional, Engineering, Machine, Measuring, Mechanical, Model, Numerical, Programming, Three.

For abstract, see STAR 05 19.
N67-33987 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.

Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

14C. Recording Devices

PRELIMINARY HIFI RADAR FILM READOUT,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 14E.
AD-656 882 HC$3.00 MF$0.65

VIBROTRON ANALOG MICROBAROGRAPH SYSTEM.
Navy Electronics Lab San Diego Calif Radio Physics Div
For primary bibliographic entry see Field 4B.
AD-657 514 Not available from CFSTI.

14D. Reliability

RELIABILITY APPROXIMATIONS FOR COMPLEX STRUCTURES.
Doctoral thesis,
Polytechnic Inst of Brooklyn N Y Dept of Electrical Engineering
Martin Messinger, and Martin L. Shooman. 1967, 13p
AFOSR-67-1918
Contract AF 49 (638)-1402
Availability: Published in Proceedings of Annual Symposium on Reliability 1967, Jan 10-12, 1967 p292-301.

Descriptors: (*Reliability, Approximation (Mathematics)), Graphics, Topology, Systems engineering.

In a reliability graph each edge represents a component of the system, the arrowhead associated with the edge the direction of flow of information, and a node at connection between components. One measure of reliability is the probability that at least one complete directed path - with no node traversed more than once - connecting the input to the output has all its components operative. The number of operations to calculate this probability increases with the number of such complete paths. Similar exponential increases apply to equivalent measures of the reliability. The contribution of this paper lies in obtaining various upper and lower bounds for the reliability with a significant computational savings. The usefulness of the bounds are evaluated and the techniques are illustrated by several examples. (Author)
AD-657 530 Not available from CFSTI.

14E. Reprography

THE SLIDE,
Armed Forces Inst of Pathology Washington D C
For primary bibliographic entry see Field 6L.
AD-656 845 Not available from CFSTI.

PRELIMINARY HIFI RADAR FILM READOUT,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
R. C. Shreckengost. 28 Mar 57, 19p Rept no. CF-2638
Contract NOrd-7386

Descriptors: (*Radar, *Photographic recording systems), Photographic film, Airborne, Film readers, Calibration, Data, Analysis, Radar recording cameras.

Readout of film taken during aircraft flights in the course of demonstrating the possibilities of radar HiFi photography is presented here to exemplify the sort of data which may soon be available for analysis. The results shown are meaningful only as preparation for analysis of carefully calibrated film anticipated from a current flight program. (Author)
AD-656 882 HC$3.00 MF$0.65

THE DESIGN AND TESTING OF AN ALL-LENS SCHLIEREN SYSTEM.
Master's thesis,
Texas Univ Austin Defense Research Lab
Ernest Christian Vogt. Jan 57, 44p Rept no. DRL-389
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md., Applied Physics Lab. CF-2546.

Descriptors: (*Schlieren photography, *Wind tunnels), Photographs, Optical equipment, Theses, Camera lenses, Design, Supersonic flow.

The subject for investigation was chosen because of the need for a schlieren system for the axi-symmetrical wind tunnel operated under Naval Ordnance Contract 16498, Task UTX-2-A, at the Defense Research Laboratory, The University of Texas. The system is required to have good sensitivity and relatively high magnification, yet remain compact and simple as possible. By the use of lenses the system is of the single pass type which gives a fairly high light intensity for photography even after the light has been monochromatized. A single pass system requires only a single path optic bench which can be readily adapted and easily adjusted to any wind tunnel installation. In contacting various wind tunnel installations throughout the United States, it was discovered that most of them used the conventional parabolic-mirror type schlieren system which is usually quite large and expensive. This lens type system is designed to be used with a wind tunnel with a small field of view, that is, a tunnel having a test section of small height and length. The system is by no means the best type but is usable and of fairly good quality. (Author)
AD-656 886 HC$3.00 MF$0.65

AN X-RAY TELEVISION SYSTEM FOR ELECTRONICS PARTS INSPECTION.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 14B.
AD-656 892 HC$3.00 MF$0.65

A STREAK SPECTROGRAPH WITH MICROSECOND RESOLUTION,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
D. E. Buttrey. 11 Oct 66, 3p
Availability: Published in Applied Optics v6 n5 p881-3 May 1967.

Descriptors: (*Spectroscopy, Instrumentation), (*Spectrographic cameras, Monochromators), Collimators, Images, Shock tubes, Brightness, Continuous spectrum, Density, Resolution, Prisms (Optics), Lenses, Rotation, Exposure meters, Reflection.

An inexpensive, time-resolved spectrograph with microsecond time resolution has been simply constructed in the laboratory. A Gaertner glass-prism monochromator with a flat focal plane was combined with a Beckman-Whitley drum camera with the lens removed. The resulting combination has a geometric aperture of f/10 with a wavelength resolution of 1 A at 4300 A. The wavelength range of 3900 A to 9000 A can be covered with three settings of the wavelength drum on the monochromator. Examples of the spectral time history of reflected shocks in nitrogen and in oxygen for the conventional shock tube are given. This instrument has been particularly useful in recording Stark-broadened hydrogen lines and oxygen lines to measure the ion density in shock-heated gas samples. A continuum brightness of 4.3 x 1,000,000 ergs/sec sq cm/sr/ (10 A) at 4300 A is required to produce a plate density of 0.3 on I-F film for optimum entrance slit width and 2.5 microsec exposure time. (Author)
AD-657 075 Not available from CFSTI.

PHOTOGRAMMETRIC MAPPING USING VERTICALITY DATA.
Ohio State Univ Research Foundation Columbus
For primary bibliographic entry see Field 8B.
AD-657 368 HC$3.00 MF$0.65

COMPARATIVE WAVEFORM ANALYSIS OF MULTISENSOR IMAGERY.
Florida Atlantic Univ Boca Raton Dept of Geography
For primary bibliographic entry see Field 8F.
AD-657 529 Not available from CFSTI.

15. MILITARY SCIENCES

15B. Chemical, Biological, and Radiological Warfare

THE RELATIVE IMPORTANCE OF BROWNIAN DIFFUSION AND OTHER FACTORS IN AEROSOL FILTRATION.
Revised ed.,
Electronic Systems Div L G Hanscom Field Mass Decision Sciences Lab
L. G. Wilson, and P. Cavanagh. 17 Jan 67, 12p
Rept no. DCBRL-521
Revision of manuscript received 9 Aug 66.
Availability: Published in Atmospheric Environment v1 p261-9 1967.

Descriptors: (*Aerosols, *Brownian motion), Filters (Fluid), Fibers, Sodium chloride, Particle size, Electrostatics, Counting methods, Canada.

The paper maintains that Brownian diffusion has been given undue importance in theories concerned with the filtration of aerosols of sub-micron particles by fibrous filters. To examine this question, the nature of Brownian motion for individual aerosol particles is discussed, and the relation of this motion to other factors operating in a filter. Some experiments designed to separate Brownian motion effects from those of interception, impaction, gravity and electrostatic forces, and assess their relative importance, are described. (Author)
AD-657 082 Not available from CFSTI.

EFFECTS UPON TANK CREWS OF SEVERAL METHODS OF PROTECTION AGAINST CHEMICAL WARFARE AGENTS.
Army Medical Research Lab Fort Knox Ky
13 Sep 44, 35p

Descriptors: (*Chemical warfare agents, Protection), Protective clothing, Protective mask facepieces, Ventilation, Tanks (Combat vehicles), Impregnation, Heat tolerance, Stress (Physiology), Army personnel.

Previous tests have shown that tank crews can be adequately protected against Chemical Warfare Agents by three methods: (1) individual combat masks, (2) individual ventilated facepieces supplied with purified air from central motor-blower-canister units and (3) collective protection of the entire tank with purified air under positive-pressure ventilation. The first two methods require

the crew to wear impregnated clothing at all times; the third method does not require impregnated clothing so long as the tank and protective system are intact. Accepting the fact that the three methods adequately protect against Chemical Warfare Agents, the relative merits of these methods were determined in a field test carried out for the purpose of determining the heat loads and limitations and advantages of the three methods in terms of physiologic effects upon the crew and upon their ability to discharge their duties. The heat load and the respiratory load appeared to impose the greatest stresses. Impairment of vision, interference with the proper use of visual equipment (particularly fire control) and restriction of movement appeared to constitute the greatest limitations. (Author)
AD-657 227 HC$3.00 MF$0.65

15C. Defense

BUDGET ALLOCATION FOR SHELTER SYSTEMS.
Research Triangle Inst Durham N C Operations Research and Economics Div
For primary bibliographic entry see Field 5A.
AD-656 940 HC$3.00 MF$0.65

COMPUTER AIDS FOR AEROSPACE DESIGN AND ENGINEERING: INNOVATION, ECONOMICS AND PUBLIC POLICY,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 5A.
AD-657 009 HC$3.00 MF$0.65

15E. Logistics

A SUGGESTED GENERAL SOP FOR THE PREPARATION OF EQUIPMENT SERVICEABILITY CRITERIA.
Technical rept.,
George Washington Univ Alexandria Va Human Resources Research Office
Paul G. Whitmore. Jun 67, 37p Rept no. TR-67-10
Contract DA-44-188-ARO-2

Descriptors: (*Army equipment, Maintainability), Combat readiness, Military requirements, Standards, Human engineering, Job analysis, Effectiveness, Instruction manuals, Maintenance personnel, Preparation.

Equipment Serviceability Criteria (ESC) are required by Army regulation on maintenance-significant, mission-essential equipment. The ESC is used to determine the combat readiness of equipment and thus of combat units. Therefore, the validity of the information provided is critical and can best be assured by a systematic method for preparing the ESC. Developing systematic procedures on an exploratory basis involved two phases. In the first, checks are selected to determine the equipment's immediate and ensuing 90-day capability to perform as required by its mission, and in the second, performance requirements are established for accomplishing the checks. Suggestions were developed for a communication system for effectively transmitting the requirements to the man who will perform the checks. (Author)
AD-656 808 HC$3.00 MF$0.65

A COMPUTERIZED INVENTORY CONTROL SYSTEM,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 5A.
AD-656 900 HC$3.00 MF$0.65

PLANET: PART III. DEPOT TRANSPORTATION SIMULATOR,
Rand Corp Santa Monica Calif
Bernard J. Voosen, and Steve Glaseman. Apr 67, 155p Rept no. RM-4661-PR
Contract F44620-67-C-0045
See also AD-655 769.

Descriptors: (*Transportation, Simulators), (*Logistics, *Cargo), Computers, Simulation, Maintenance, Costs, Mathematical models, Interactions, Environment, Programming (Computers), Weapon systems, Management engineering, Effectiveness, Computer logic.
Identifiers: Planet.

Computer routines, operating manual, and programmer's manual for the Depot Transportation (DT) Simulator, the third of four simulation programs constituting the Planned Logistics Analysis and Evaluation Technique (PLANET). The DT simulator is designed to simulate the movement of logistics resources from base to base and from base to depot or factory and return. It takes as inputs the various operating characteristics of the transportation system, the expected cargo to be moved through time, and a planned set of transport vehicles. Outputs from the simulation can be used as an aid in determining the quantity of resources that can be moved over time and the costs associated with the operation of the system. (Author)
AD-657 012 HC$3.00 MF$0.65

A DEMAND PREDICTION TECHNIQUE FOR ITEMS IN MILITARY INVENTORY SYSTEMS,
George Washington Univ Washington D C Logistics Research Project
Sheldon E. Haber, Rosedith Sitgreaves, and Henry Solomon. 26 Jul 67, 29p Rept no. Serial T-199
Contract N00014-67-A-0214

Descriptors: (*Logistics, *Inventory control), (*Armed forces procurement, *Management engineering), Maintenance, Spare parts, Armed forces supplies, Predictions, Model tests, Probability, Model theory.

A brief description of a new general approach to demand prediction problems is given. This is based on the demand characteristics of parent components and the parts installed in these components. A specific model is presented which employs this information. The paper concludes with empirical tests of the model. (Author)
AD-657 180 HC$3.00 MF$0.65

COMMUNICATION IMPACT: A CONCEPTUAL MODEL ANALYSIS OF INDIVIDUAL PREDISPOSITIONS AND THE ANALYSIS OF THE IMPACT OF A COUNTY CIVIL DEFENSE EDUCATIONAL PROGRAM.
Final summary rept.,
Iowa State Univ Ames Dept of Sociology and Anthropology
George M. Beal, Gerald E. Klonglan, Joe M. Bohlen, and Paul Yarbrough. Mar 67, 98p Rept no. Rural Sociology-41S
Contract OCD-PS-65-9

Descriptors: (*Civil defense systems, Sociology), (*Communication systems, *Rural areas), Impact, Predictions, Attention, Attitudes, Reaction (Psychology), Model tests, Psychometrics.

The study deals with communication at three levels. The first level involves the development of a generalized model of the process by which communication achieves impact. The second level is the operationalization of the impact model. The third level is testing the degree to which the model predicts the response of members of the potential audience to a specific communication event. The communication impact model developed in this study takes the intent and content of the communication message as given and then proceeds to examine the responses which the total potential audience makes. A basic notion included in the model is that in receiving and responding to a message, the receiver must perform several functions. These functions can be logically integrated into a flow of action, the stages of action representing a series of communication filters. Three major filter stages are delineated: attention, comprehension and acceptance. The attention filter stage has four sub-stages: awareness, attend decision, differential exposure and secondary contact. The acceptance stage has two sub-stages: attitudinal acceptance and overt action. Another basic notion included in the model is that the response of a receiver at any given filter stage is not random. Rather the receiver is predisposed--through his previous experience, through what he perceives to be his interest--to react to a given message in a predictable manner. The communication event analyzed is the Midwest County Civil Defense Exhibit. The findings of this analysis strongly support the notions included in the impact model. Implications of these findings for civil defense communications are drawn from the findings. (Author)
AD-657 217 HC$3.00 MF$0.65

FOURIER ANALYSIS OF THE WEISS-HERMAN TRAFFIC EQUATION,
Naval Weapons Center China Lake Calif
For primary bibliographic entry see Field 12B.
AD-657 421 Not available from CFSTI.

16. MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

TECHNICAL MANUALS EVALUATION PROGRAM: SIMMS FORMAT VERSUS CONVENTIONAL ORDNANCE PAMPHLET,
Naval Underwater Weapons Research and Engineering Station Newport R I
For primary bibliographic entry see Field 5B.
AD-657 175 HC$3.00 MF$0.65

16B. Missile Trajectories

BOOST PHASE TRAJECTORY ANALYSIS TECHNIQUES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
C. D. West. Apr 56, 19p Rept no. CF-2505
Contract NOrd-7386

Descriptors: (*Guided missile trajectories, Mathematical analysis), Equations of motion, Boosters, Acceleration, Initial value problems.

The analysis of the performance of a rocket-boosted missile during the boost-phase portion of its flight generally requires that one solve a set of simultaneous differential equations with variable coefficients for a large variety of initial conditions. Analytical methods of solution are formidable if not impossible and consequently ways and means have been developed to accomplish the task with minimum possible effort while maintaining sufficient accuracy and reliability. This paper consists of a collection of four approaches to the problem and is presented with the hope that future analysts will not have to tread the same ground again. The particular treatment outlined here is for a cruciform missile-booster combination, completely symmetrical with respect to any two normal planes passing through the longitudinal centerline. The extension of the methods to unsymmetrical configurations is simple since it merely adds one more equation. The additional volume of calculations is another matter. Since the paper is concerned only with the boost phase performance, the word missile is used in the text to mean the missile-booster combination.
AD-657 131 HC$3.00 MF$0.65

SOUNDING ROCKET TRAJECTORY DETERMINATION FROM SINGLE STAGE RANGE MEASUREMENTS ONLY.
Tuab Teleutredningar A.B., Solna (Sweden). Space Technology Group.
J. Martin-loef. May 67, 24p REPT.-67-19

Descriptors: *Range and range rate tracking, *Sounding rocket, *Trajectory analysis, Analysis, Computer, Fall, Free, Measurement, Method, Numerical, Program, Range, Rate, Rocket, Single, Sounding, Station, Tracking, Trajectory.

For abstract, see STAR 05 19.
N67-33642 HC$3.00 MF$0.65

16D. Missiles

OPTIMUM MAINTENANCE WITH INCOMPLETE INFORMATION,
Rand Corp Santa Monica Calif
James E. Eckles. Aug 67, 29p Rept no. RM-5390-PR
Contract F44620-67-C-0045

Descriptors: (*Guided missiles (Air-to-air), Random variables), (*Maintenance, *Costs), Performance (Engineering), Dynamic programming, Mathematical models, Stochastic processes, Equations, Aging (Materials), Deterioration, Probability, Optimization.

An analysis of the maintenance of systems with randomly decreasing performance levels that can be estimated only by costly imperfect inspection. A model is developed to determine the sequence of actions that minimizes the total cost of operation. Unlike most investigations, the study treats maintenance as a sequential decision process. This view leads to the consideration of maintenance policies in which corrective and inspection schedules are dependent on the results of recent inspections. A dynamic-programming technique is used to derive a functional equation for the optimum maintenance policy. It is shown that an optimum action (replacement, repair, inspection, etc.) is determined by the system's age and the posterior distribution over the system's states. Simple policies such as periodic inspection are readily seen to be nonoptimal in the face of irregular deterioration. (Author)
AD-657 010 HC$3.00 MF$0.65

EXPERIMENTAL STUDIES ON VIBRATION CHARACTERISTICS OF SOME IDEALIZED MISSILE FINS,
Texas Univ Austin Defense Research Lab
For primary bibliographic entry see Field 20K.
AD-657 138 HC$3.00 MF$0.65

SANDWICH PLATES HAVING DISSIPATIVE CORES, AS VIBRATION ENERGY ABSORBERS,
Texas Univ Austin Defense Research Lab
For primary bibliographic entry see Field 20K.
AD-657 140 HC$3.00 MF$0.65

RESEARCH AND DEVELOPMENT PROGRAMS QUARTERLY REPORT, JAN. - MAR. 1967.
Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
For primary bibliographic entry see Field 20D.
For abstract, see STAR 05 19.
N67-33361 HC$3.00 MF$0.65

COMPARATIVE STUDY OF VARIOUS SOUNDING ROCKETS.
Etude Comparative de Diverses Fusees Sondes
European Space Technology Center, Noordwijk (Netherlands).
M. Guerin. Oct 66, 22p ESRO-TM-8
In French, English Summary

Descriptors: *Payload mass ratio, *Performance characteristics, *Sounding rocket, Altitude, Apogee, Characteristics, Diameter, Mass, Payload, Performance, Ratio, Rocket, Size, Sounding, Weight.

For abstract, see STAR 05 19.
N67-33637 HC$3.00 MF$0.65

PAYLOAD MISSIONS AND CONSTRUCTION OF THE THIRD RUBIS ROCKET.
Max-planck-institut Fur Physik Und Astrophysik, Munich (West Germany).
For primary bibliographic entry see Field 4A.
For abstract, see STAR 05 19.
N67-33942 HC$3.00 MF$0.65

17. NAVIGATION, DETECTION, COMMUNICATIONS, AND COUNTERMEASURES

17A. Acoustic Detection

TWO FORTRAN PROGRAMS (0577 AND 0717) FOR COMPUTING ELECTROACOUSTICAL BEHAVIOR OF TRANSMITTING SONAR ARRAYS,
Navy Underwater Sound Lab New London Conn
David T. Porter. 15 Jun 67, 49p Rept no. USL-791

Descriptors: (*Sonar arrays, *Computer programs), Baffles, Performance (Engineering), Mathematical models, Acoustic impedance.

The Underwater Sound Laboratory's FORTRAN Programs 0577 and 0717 compute the steady-state electrical, mechanical, and acoustical behavior of transmitting sonar arrays. These programs, which have considerable flexibility, are able to accommodate up to three different arrays on the same baffle; and, since the transducers in these arrays need not be identical, 'stagger-tuned' arrays can be used. The arrays may be mounted on rigid planar, cylindrical, or spherical baffles. Based on the transducer characteristics that are read in as input data, Programs 0577 and 0717 compute an equivalent circuit and from it a Thevenin-equivalent circuit. Pritchard's mutual impedance formula is used to compute a mutual impedance matrix. The transducer driving forces are generated from the given amplifier data; knowledge of the equivalent circuit; and the phasing, steering, and shading to be used. Depending on the size of the array, the transducer face velocities are computed from the equations relating them to the driving forces and mutual impedance matrix either by direct matrix inversion (Program 0577) or an iterative patch method (Program 0717). Then the radiation impedances, electrical input impedances, and electrical powers, currents, voltages, efficiency, etc., can be computed. The farfield pressure pattern and source level are determined by the face velocities and appropriate element directivity patterns. The directivity index is obtained from knowledge of the source level, total electric power, and efficiency. A plan is given for a more detailed analysis of a transmitting array, including its sonar dome. The analysis would be done by six computer programs run sequentially. (Author)
AD-656 913 HC$3.00 MF$0.65

DOME EFFECTIVENESS AND THE SCALING AND AREA DEPENDENCE OF BOUNDARY-LAYER PRESSURE SPECTRA VIEWED WITH REGARD TO CHARACTERISTIC WAVENUMBER RANGES,
Trg Inc Melville N Y
David M. Chase. Dec 65, 30p Rept no. TRG-011-TN-65-8
Contract Nonr-4385 (00)

Descriptors: (*Sonar domes, Acoustics), (*Turbulent boundary layer, Underwater), Noise, Damping, Pressure, Spectroscopy, Effectiveness, Fluid flow, Reduction, Configuration, Design.

In the design of sonar systems, achievement of optimum configurations, or positive control, for flow noise depends on adequately understanding its generation by pressure fluctuations associated with a turbulent boundary layer. The paper emphasizes certain facts and presumptions, mostly already recognized, and uses a corresponding characterization of the pressure field to point out relations depending mainly on the grosser and more immediately relevant properties, with application both to flush-mounted and dome-shielded elements and arrays.
AD-657 371 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

17B. Communication

SPEECH COMMUNICATION INDEX METER: FURTHER APPLICATIONS AND IMPROVEMENTS.
Final rept.,
Bolt Beranek and Newman Inc Cambridge Mass
Michael H. L. Hecker, Gottfried von Bismarck, and Carl E. Williams. 26 Jul 67, 87p Rept no. BBN-1481
ESD-TR-67-516
Contract AF 19 (628)-5874

Descriptors: (*Voice communication systems, *Intelligibility), (*Speech, *Communication systems), Troposphere, Scattering, Feasibility studies, Recording systems, Signal-to-noise ratio, Psychoacoustics, Signal generators, Synchronization (Electronics), Accuracy.
Identifiers: Index meter.

To study the feasibility of using the Speech Communication Index Meter (SCIM) to evaluate time-varying communication systems, recordings were made of the transmission characteristics of a troposphere-scatter system. At many specific points in time in these recordings, Articulation Indexes were calculated and intelligibility scores were obtained from listeners with the aid of a special test procedure. For most points, the intelligibility score could be reasonably well predicted from the Articulation Index. This finding was interpreted as indicating that SCIM is potentially capable of evaluating time-varying systems. In a second study, SCIM was used to predict the intelligibility of peak-clipped speech. For a wide range of signal-to-noise ratios and clipping levels, the performance of SCIM was compared with intelligibility test results reported in the literature. After a minor modification, SCIM computed reliable SCI's which could be related to the published intelligibility data. This study demonstrated that SCIM could accurately evaluate communication systems employing peak clipping. SCIM was also modified to reduce the computation time, and to improve the synchronization between the signal generator and the analyzer. In addition, various other circuit changes were implemented to improve the performance of SCIM.
AD-656 788 HC$3.00 MF$0.65

RESEARCH LABORATORY OF ELECTRONICS QUARTERLY PROGRESS REPORT NO. 86, JULY 15, 1967,

Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 20I.
AD-656 868 HC$3.00 MF$0.65

DEVELOPMENT OF A CONTACTLESS M-TYPE TRANSMITTER.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
P. A. Stickels. Oct 66, 21p Rept no. RAE-TR-66334

Descriptors: (*Data transmission systems, Sensors), Great Britain, Switching circuits, Photoelectric cells (Semiconductor), Performance (Engineering), Accuracy.

Existing M-type transmitters all operate on principles involving the use of moving or rubbing contacts which are subject to wear and erosion resulting in degradation of performance and short life. The development of a contactless transmitter is described together with tests which were made to ascertain the probable overall performance that could be expected from production models. (Author)
AD-656 873 HC$3.00 MF$0.65

AN X-RAY TELEVISION SYSTEM FOR ELECTRONICS PARTS INSPECTION.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 14B.
AD-656 892 HC$3.00 MF$0.65

INTERPRETATION OF THE STATISTICS OF OCCURRENCE OF ALOUETTE I EARTH ECHOES,
Defence Research Telecommunications Establishment Ottawa (Ontario) Radio Physics Lab
For primary bibliographic entry see Field 20N.
AD-656 945 Not available from CFSTI.

HISTORICAL ANALYSIS OF ELECTROMAGNETIC INTERFERENCE LIMITS,
Aerospace Corp El Segundo Calif Technical Operations
For primary bibliographic entry see Field 20N.
AD-657 014 HC$3.00 MF$0.65

PERFORMANCE OF THE SUPPORT SYSTEMS ABOARD THE DME-A SATELLITE, 29 NOV. 1965-FEB. 1967.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 22B.
AD-657 156 HC$3.00 MF$0.65

A SECOND MOMENT EXPONENTIAL ERROR BOUND FOR PEAK LIMITED BINARY SYMMETRIC COHERENT CHANNELS AT LOW SNR.
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
For primary bibliographic entry see Field 9D.
AD-657 167 HC$3.00 MF$0.65

EFFECT OF OFF-PATH IONOSPHERIC REFLECTIONS ON VLF RADIO WAVES.
Navy Electronics Lab San Diego Calif
For primary bibliographic entry see Field 20N.
AD-657 172 HC$3.00 MF$0.65

COMMUNICATION IMPACT: A CONCEPTUAL MODEL ANALYSIS OF INDIVIDUAL PREDISPOSITIONS AND THE ANALYSIS OF THE IMPACT OF A COUNTY CIVIL DEFENSE EDUCATIONAL PROGRAM.
Iowa State Univ Ames Dept of Sociology and Anthropology
For primary bibliographic entry see Field 15E.
AD-657 217 HC$3.00 MF$0.65

DATA TRANSMISSION AND INSTRUMENTATION SYSTEMS FOR SPACE VEHICLES.
Northeastern Univ Boston Mass
For primary bibliographic entry see Field 22B.
AD-657 287 HC$3.00 MF$0.65

A DEMONSTRATION OF THE CONSISTENT OPERATIONAL SUCCESS OF 2400 BAUD HF AUTODIN DATA TRANSMISSION USING THE CURTS PHASE II SYSTEM.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 17B.
AD-657 366 HC$3.00 MF$0.65

A DEMONSTRATION OF THE CONSISTENT OPERATIONAL SUCCESS OF 2400 BAUD HF AUTODIN DATA TRANSMISSION USING THE CURTS PHASE II SYSTEM.
Part 5 of final rept.,
Stanford Research Inst Menlo Park Calif
J. L. Ramsey, K. D. Felperin, and T. I. Dayharsh. Aug 67, 67p
Contract DCA100-67-C-0068

Descriptors: (*Data transmission systems, Digital systems), High frequency, Performance (Engineering), Radio communication systems, Automatic, Radiofrequency, Selection, Control systems.
Identifiers: AUTODIN.

The report describes an experiment that was conducted to evaluate the improvement in 2400-baud HF AUTODIN data transmission that can be realized when the CURTS (Common User Radio Transmission Sounding) Phase II Automatic Frequency Selection System is used to select communication frequencies on an operational 8000-km HF trunk. The following results were obtained: (1) The capability of HF to give consistent support to 2400-baud AUTODIN traffic was clearly established. (2) Use of the CURTS system improved the HF communication system performance both by increasing the average AUTODIN throughput from 92.7% to 97.4% and by reducing its standard deviation from 12% to 4.5%. CURTS therefore reduces the average number of AUTODIN cards lost per day from 21,900 to 7,800, or offers nearly a 3:1 improvement. (3) The most substantial improvement to HF communication can be made by evolving the effective and extensive frequency management techniques that CURTS makes possible. (4) The results of this experiment agree well with HF performance predictions made from evaluation of the CURTS data of the previous eight months. (5) Effective CURTS frequency management techniques would make the HF medium a viable alternative to other communication media. (Author)
AD-657 366 HC$3.00 MF$0.65

FEASIBILITY STUDY 19.2KBS IN A 3KHZ CHANNEL.
Final rept.,
Stelma Inc Stamford Conn
Howard G. Robbins, and Adrio L. Vannoni. Aug 67, 100p Rept no. 9118
Contract DCA-69

Descriptors: (*Transmission lines, *Data transmission systems), Feasibility studies, Amplitude modulation, Errors, Performance (Engineering).

The report describes a study to determine the feasibility of transmitting 19.2 kilobits per second through a schedule 4B line or TAT-2 submarine cable. The technique chosen for study was double sideband, quadrature suppressed carrier, amplitude modulation employing sixteen discrete levels of amplitude. The work performed included design and construction of a laboratory test model of the modem, and tests of the completed modem using various simulated line conditions. Typical of the results obtained in the study was an error probability of 0.005 at 14,400 bits per second at a 30db signal to noise ratio, and with delay simulation in the signal path. Transmission at 19.2 kilobits per second was not obtained, but with further work, as recommended in this report, transmission at 9.6Kb, at an error rate of 0.00001 and possibly 14.4Kb at an error rate of 0.006 is feasible. (Author)
AD-657 458 HC$3.00 MF$0.65

DIRECTIONS FOR INSTALLATION AND OPERATION OF VOICE COMMUNICATION TRAINING EQUIPMENT UTILIZING DEVICE 8-I.
Research rept.,
Purdue Univ Lafayette Ind
M. D. Steer. 1948, 36p
SPECDEVCEN-104-2-2
Contract N6ori-104 (02)

Descriptors: (*Voice communication systems, *Training devices), (*Installation, Training devices), Operation, Amplifiers, Safety, Calibration, Intelligibility, Tests.

Contents: Directions for installation and operation of voice communication training equipment utilizing device 8-I; (room requirements, installation, accessory equipment, putting the device 8-I into operation, safety precautions, technical information); Adjusting the amplification applied to the voice channel of device 8-I; Calibrating voice channel gain on device 8-I; A control panel for use with device 8-I. (Author)
AD-657 465 HC$3.00 MF$0.65

FREQUENCY DISTORTION IN THE DEVICE 8-I PORTABLE INTERPHONE TRAINER,
Purdue Univ Lafayette Ind
For primary bibliographic entry see Field 5I.
AD-657 467 HC$3.00 MF$0.65

PURDUE SPEECH SOUND TIMER.
Technical rept.,
Purdue Univ Lafayette Ind
H. J. Tyler, and G. L. Draegert. 1 Apr 48, 14p
SPECDEVCEN-104-2-7
Contract N6ori-104 (02)

Descriptors: (*Voice communication systems, Intelligibility), (*Test equipment (Electronics), Verbal behavior), Measuring devices (Electrical + electronic), Wiring diagrams, Performance (Engineering), Acoustics.
Identifiers: Speech sound timer.

This technical report concerns the development of an instrument designed to permit the careful study of the three psycho-physical traits related to speed of voice transmissions, namely words per minute, duration of speech sounds, and pause time.
AD-657 468 HC$3.00 MF$0.65

AN EXPERIMENTAL COMPARISON OF 5 CONDITIONS FOR VOICE COMMUNICATION TRAINING,
Purdue Univ Lafayette Ind
J. C. Kelly. 10 Jul 47, 17p
SPECDEVCEN-104-2-3
Contract N6ori-104 (02)

Descriptors: (*Speech, Intelligibility), (*Speech transmission, Training), Noise, Voice communication systems.

Five groups of undergraduate men were trained to increase word-intelligibility under difficult communication conditions, using course content founded on experience gained during World War II. Each group was trained in a situation presenting a different type or amount of interference. Effects of training were evaluated by word-intelligibility tests and by judgments of connected speech. All tests were presented under conditions of high level airplane-type noise. All training conditions required high effort on the part of speakers in order to be understood. Comparison of increases in

word-intelligibility of experimental and control subjects showed that: (a) Subjects which practiced under most severe noise conditions gained least. (b) Subjects trained under conditions of noise 10 VU less severe, gained substantially more than those trained under most severe noise. (c) Subjects trained under a condition presenting a less intense noise than used in (b) above, gained substantially more than any other group. The noise used with this group consisted of garbled speech signals. (d) Two practice conditions which did not employ an interphone system produced slightly greater gains than the severe noise condition, but less than the condition presenting a reduced level of airplane noise (b). (e) Experimental subjects gained substantially more than control subjects who were given the same tests after preliminary indoctrination in use of equipment. (Author)
AD-657 469 HC$3.00 MF$0.65

EVALUATION OF THE PRIMARY FLIGHT HELMET, DEVICE 12-BK-6 (IMPACT-AUDIBLE SIGNAL SYSTEM FOR FLIGHT TRAINING).
Technical rept.,
Kenyon Coll Gambier Ohio
John W. Black. 1 Dec 49, 26p
SPECDEVCEN-411-1-18
Contract N7onr-411 (01)

Descriptors: (*Helmets, Communication systems), (*Training devices, Communication systems), Naval aviation, Effectiveness, Voice communication systems.

Ten tests were made of the Impact-Audible Signal System, Primary Flight Helmet Device 12-BK-6 (PFH). In general, it was found to be unsatisfactory.
AD-657 474 Not available from CFSTI.

CLOSED-CIRCUIT TELEVISION AS AN AID IN SHIP CONTROL.
Defence Research Medical Labs Toronto (Ontario)
Peter J. Dean, Ronald E. F. Lewis, and R. O. Morphet. 1967, 10p Rept no. DRML-649
Availability: Published in Journal of the Institute of Navigation v20 n2 p121-30 Apr 1967.

Descriptors: (*Closed circuit television, Control systems), (*Ships, Control systems), Visibility, Television cameras, Images, Visual perception, Television equipment.

A continuing study of ship's bridge design and ship control conducted by the Defence Research Board of Canada has recognized that the conventional method of issuing and executing verbal orders contains inherent delay and is a possible source of error in ship control. As a partial solution to this problem, it was proposed that 'the officer originating decisions to change the course and speed should implement these decisions himself through the direct control of helm and engines on the bridge'. A television camera positioned on a suitably high structure, providing an image of the ship and the surrounding water, would improve visibility from the conning position. A sea trial, described in the present report, was therefore conducted to explore some of the advantages of using television displays to show the critical areas about the vessel which are otherwise 'blind'. Systematic observations were made aboard a Canadian Coast Guard vessel with and without closed-circuit television. The primary areas of interest, in order of importance, were: use of the television system as a visual aid in controlling the ship from the centre-line; use of the television system as the only visual means of ship control, i.e. 'blind' ship control; determination of operator difficulties in the interpretation of the television display; possible applications of television to the duties of Coast Guard vessels, especially ice-breaking and buoy tending; optimum arrangement and location of the television cameras and ancillary equipment, e.g. pan and tilt mechanism. (Author)
AD-657 502 Not available from CFSTI.

CALCULATION OF SIGNAL MARGINS FOR THE CSM UNIFIED S-BAND DOWNLINK CHANNEL APOLLO AS-202 TO AIRCRAFT NASA 432.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
D. A. Dalgleish. Aug 66, 33p NASA-TM-X-55854, X-552-66-424

Descriptors: *Apollo project, *S-band, *Signal transmission, *Spacecraft communications system, Acquisition, Calculation, Command, Communication, Margin, Module, Radar, Receiver, Service, Signal, Spacecraft, System, Tracking, Transmission, Transmitter.

For abstract, see STAR 05 19.
N67-33855 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

17E. Infrared and Ultraviolet Detection

ELECTRONIC EQUIPMENT USED FOR I.R. RADIATION MEASUREMENT DURING A SPACE EXPERIMENT.
Chaines Electriques Utilisees Au Cours D'une Experience Spatiale pour La Mesure de Rayonnements Infrarouge
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
M. Gay. 1967, 10p CONERA-TP-465/1367/ in French Presented At the Intern. Colloq. on Electron. and Space, Paris, 10-15 Apr. 1967

Descriptors: *Electronic equipment, *Infrared detector, Design, Detector, Effect, Electronic, Equipment, Experiment, Infrared, Measurement, Radiation, Receiver, Sensitivity, Space, Thermal.

For abstract, see STAR 05 19.
N67-33947 HC$3.00 MF$0.65

17G. Navigation and Guidance

THE DYNAMICS OF A FOUR DEGREE OF FREEDOM GIMBALLED PLATFORM,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
James R. Jacques. 4 Apr 56, 14p Rept no. CF-2504
Contract NOrd-7386

Descriptors: (*Stabilized platforms, Dynamics), Gimbals, Equations of motion, Partial differential equations.

The platform here considered is cradeled within three gimbals whose purpose is to provide the various degrees of freedom desired. Two approaches are used to obtain the equation of motion: The torque-momentum approach, and the application of Lagranges equations. In the torque-momentum approach, Euler's equations are obtained for each rigid body of the system, with action torques on each body manifesting themselves as reaction torques on the adjacent body. A combination of all the equations then essentially puts the system together to form the system equations. Such a method is involved, but more readily reveals the dynamics of the inner workings of the system than does the application of Lagranges equations. The system readily adapts itself to the use of Lagranges equations, which are simplified by the constant potential characteristic. The system possesses four degrees of freedom, therefore four equations of motion emerge. Since the system is described in terms of displacements about the bearing axes, such displacements become naturally the generalized coordinates in Lagranges equations. The generalized torques then represent the friction type torques along the various bearing axes. Equations obtained by the torque-momentum approach do not appear initially as friction type torque equations, rather they manifest inertial reactions of the system to other components of torque. However an appropriate grouping of these equations to the friction type torque form readily admits comparison with the results of the Lagrange approach. Equations presented herein have been so adjusted and checked.
AD-656 879 HC$3.00 MF$0.65

SATELLITE POSITION AND VELOCITY PERTURBATIONS DUE TO ERRORS AT INJECTION.
Technical rept.,
Air Force Missile Development Center Holloman AFB N Mex
Richard J. Schulte. Jun 67, 40p Rept no. MDC-TR-67-78

Descriptors: (*Satellites (Artificial), *Navigation), Control, Perturbation theory, Velocity, Guided missiles, Errors, Accuracy, Guidance, Motion, Equations.

The orbit of a near-earth satellite will, in general, be different from the reference orbit designed by the mission planners. The time varying differences or errors in position and velocity can usually be traced to random uncertainties in the booster guidance system. As a result, the in-orbit errors are statistical in nature and their prediction usually requires a complex computer study. The paper reports a simpler approach to the prediction of satellite position and velocity errors in-orbit. A set of analytic equations are developed which express a satellite's position and velocity errors as a function of time and initial errors. These equations permit an understanding of the dynamics of vehicle motion. They can be used to cross check more sophisticated computer studies. The approximate solutions permit easy study of satellites at various altitudes and error propagation through multiple orbits. The equations show that in a polar coordinate system a satellite exhibits oscillating vertical and cross plane position errors while the downrange position error grows as a linear function of time. (Author)
AD-657 028 HC$3.00 MF$0.65

EVALUATION OF THE NAVY NAVIGATION SATELLITE SYSTEM AND THE OMEGA NAVIGATION SYSTEM.
Informal rept.,
Naval Oceanographic Office Washington D C
Willard M. Swartwood, and Leslie L. Cunningham. Aug 67, 19p Rept no. NOO-IR-67-61

Descriptors: (*Satellites (Artificial), *Navigation), Very low frequency, Radar equipment, Radar tracking, Accuracy, Navy.
Identifiers: NAVSAT, OMEGA.

The paper summarizes the results of tests conducted aboard the USS GYATT (DD-712), during the period 9 through 16 September 1966. The Navy Navigation Satellite System (NAVSAT) and the OMEGA Navigation System were evaluated using precise RADAR fixes from the Wallops Island RADAR Tracking Station as a yardstick. NAVSAT and OMEGA fixes gave position differences less than 0.5 nautical miles and 2 nautical miles, respectively. (Author)
AD-657 124 HC$3.00 MF$0.65

THEORY OF THE FREE GYRO,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
James R. Jacques. 25 Oct 56, 28p Rept no. CF-2582
Contract NOrd-7386

Descriptors: (*Gyroscopes, Theory), Gimbals, Equations of motion, Graphics, Drift.

An analogy between the free gyro and the generalized governor treated by Minorsky is found to exist, prompting the phase space representation. Various types of nutation phase space trajectories are represented and 'dual' trajectories discovered and discussed. The intimate relationship between nutation and precession is examined, producing drift as a necessary consequence of the asymmetry of nutation trajectories. Choosing specific gyro parameters and several levels of gyro excitation, a satisfactory comparison of the two methods of obtaining gyro drift is made. (Author)
AD-657 149 HC$3.00 MF$0.65

A THEORETICAL TREATMENT OF SCHULER TUNING AS APPLIED TO INERTIAL NAVIGATION SYSTEMS,
Goodyear Aerospace Corp Litchfield Park Ariz
David W. Curtis. 13 Nov 56, 43p Rept no. GERA-406
Contract NOrd-16164
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab., rept. CF-2521.

Descriptors: (*Inertial navigation, Equations of motion), Accelerometers, Stabilized platforms, Differential equations, Errors, Analysis, Theory.

Two methods of Schuler-tuning an inertial navigation system for motion on a spherical earth were partially investigated under the assumption of perfect components. In each method, differential equations were derived that describe the orientation of the system as a function of time relative to a particular coordinate system. In each case, the particular coordinate system represented the desired orientation of the system. For each method, the differential equations were studied for the special case of motion that cancels the earth's rotation (i.e., the system remains stationary with respect to inertial space); and solutions were found insofar as was possible without recourse to numerical methods. As was expected, both methods lead to systems that are inherently unstable. System B seems to be superior to System A in that it is subject to fewer unstable modes of motion under the conditions studied. Variations in altitude above the earth and the ellipticity of the earth were neglected to permit some solutions to the differential equations. (Author)
AD-657 161 HC$3.00 MF$0.65

ANALYSIS OF VECTOR ANALOGUE COMPUTER.
Final rept.
Electro Technical Analysis Corp Tucson Ariz
Jun 67, 128p
FAA-RD-67-37
Contract FA-67-WA-1674

Descriptors: (*Navigation computers, *Navigational aids), Performance (Engineering), Wiring diagrams, Mathematical analysis, Calibration, Flight instruments, Aviation safety, Analog computers.

The principles and implementation of the Butler Vector Analog Computer are analyzed with emphasis on four concepts: ustance proportional filtering, servo loop follow up speed limitations, constant deviation, and VOR receiver rf and af detection improvements. The VAC principles are found to be particularly advantageous when symmetrical VORTAC scalloping exists at frequencies higher than the VAC variable low-pass filtering threshold, (which is a function of amplitude owing to the nonlinear circuit implementation). The mathematical analysis tends to support the Butler Research conclusions that a substantial portion of observed VOR scallops can be attributed to spurious receiver response to rf amplitude changes. (Author)
AD-657 196 HC$3.00 MF$0.65

DETERMINATION AND APPLICATION OF INERTIAL COMPONENT WARM-UP CHARACTERISTICS.
Final rept.,
Naval Air Development Center Johnsville Pa Aero Mechanics Dept
Kenton L. Bachman. 3 Aug 67, 37p Rept no. NADC-AM-6721

Descriptors: (*Inertial navigation, Instrumentation), (*Instrumentation, Thermal properties), Instrumentation, Gyroscopes, Accelerometers, Determination, Mathematical models, Errors, Performance (Engineering), Predictions, Systems engineering.

Methods of determining warm-up characteristics of inertial components are investigated. A statistical definition in terms of noise and mean value is outlined. Major emphasis is given to the development of a thermal error model equation having broader system application. Examples illustrating the value of the model for predicting errors in system alignment and gyrocompassing are shown. (Author)
AD-657 340 HC$3.00 MF$0.65

RADIOISOTOPE TAXI GUIDANCE SYSTEM. PHASE II. FABRICATION AND INSTALLATION.
Volume 2 of final rept.,
Parametrics Inc Waltham Mass
B. Sellers, and J. Hunerwadel. Mar 67, 41p
FAA-RD-67-35
Contract FA-65-WA-1334
See also AD-655 922.

Descriptors: (*Taxiing, Guidance), (*Guidance, Radioactive isotopes), Feasibility studies, Gamma counters, Scintillation counters, Detectors, Runways, Visibility, Krypton, Pipes, Position finding.

An experimental model of the radioisotope zero visibility taxi guidance system was fabricated, lab tested, and installed at the FAA National Aviation Facilities Experimental Center. Some difficulties were encountered in placing the gas handling system in operation, principally as a result of the necessity of using plastic rather than copper pipe. The final tests carried out in an aircraft under simulated zero visibility conditions demonstrated that the entire system is operationally feasible, and that the FAA design goals can either be achieved or closely approached. It is recommended that out after some suggested improvements are made and that, based on the results, a prototype be designed, constructed and tested. (Author)
AD-657 442 HC$3.00 MF$0.65

A STUDY OF THE MOVING FIGURE AND ORIENTATION OF SYMBOLS ON PICTORIAL AIRCRAFT INSTRUMENT DISPLAYS FOR NAVIGATION.
Illinois Univ Urbana Dept of Psychology
For primary bibliographic entry see Field 5E.
AD-657 470 HC$3.00 MF$0.65

A MANUAL ABORT GUIDANCE TECHNIQUE WITH CONCENTRIC-FLIGHT-PLAN RENDEZVOUS.
National Aeronautics and Space Administration Langley Research Center, Langley Station, Va
For primary bibliographic entry see Field 22C.
For abstract, see STAR 05 19.
N67-33456 HC$3.00 MF$0.65

ANALYSIS AND DESIGN OF SPACE VEHICLE FLIGHT CONTROL SYSTEMS. VOLUME VI. STOCHASTIC EFFECTS.
General Dynamics/Convair, San Diego, Calif.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 19.
N67-33461 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

17I. Radar Detection

A TECHNIQUE FOR IMAGE FREQUENCY REJECTION,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Martin Schetzen. 23 Jul 56, 13p Rept no. CF-2554
Contract NOrd-7386

Descriptors: (*Radar images, Differentiating circuits), Noise (Radar), Inhibition, Phase shifters, Mixers (Electronics).

One of the sources of interference in a radar is the reception of extraneous signals which are within the image pass band of the I-F amplifier. In this report, a method to reject the image pass band is presented. (Author)
AD-656 880 HC$3.00 MF$0.65

PRELIMINARY HIFI RADAR FILM READOUT,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 14E.
AD-656 882 HC$3.00 MF$0.65

FINAL REPORT ON CONTRACT AF 19 (628)-4142.
Ewen Knight Corp East Natick Mass
Jul 64, 167p
ESD-TR-67-456
Contract AF 19 (628)-4142

Descriptors: (*Moon, Illumination), (*Radar tracking, *Systems engineering), (*Radar receiv-

ers, Performance (Engineering)), Radar echo areas, Boresighting, Geodesics, Refractive index, Microwaves, Radar signals, Ranges (Distance), Radar transmitters, Costs, Radar equipment, Radar antennas, Reflection, Earth (Planet), Instrumentation, Feasibility studies, State-of-the-art reviews.
Identifiers: FPQ-6 radar system.

The document summarizes the results of a study directed to an analysis of the applicability of a unique technique for: boresighting of range instrumentation radar systems; measurement of microwave refractive index; geodetic measurements. An analysis of the basic concept indicates that experimental verification is feasible, utilizing an existing range instrumentation radar system (FPQ-6) as a receiving terminal for a bistatic moonbounce experimental test system. The performance requirements for the transmitting terminal have been analyzed in detail and found to be well within current state-of-the-art capability. A preliminary engineering investigation of methods for implementing the experiment at minimum cost has led to the conclusion that the majority of equipments required either are, or can be, made available from government inventory in a form suitable for integration into the required system mode of operation.
AD-657 035 HC$3.00 MF$0.65

PARAMETRIC AMPLIFIER INTERIM WEATHER FIX.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
William F. Herget, and Domenick L. Offi. Jul 67, 23p
FAA-RD-67-41

Descriptors: (*Parametric amplifiers, *Radar interference), Radar clutter, Noise (Radar), Radar receivers, Weather, Storms, Attenuation, Stability.

Two methods of reducing the effects of the parametric amplifier on weather clutter were investigated. The first method involved turning off the parametric amplifier during periods of severe weather. The second method provided for RF attenuation at the receiver input. The first method was rejected primarily because it did not lend itself to remote control from the operator's position. The second method fully met all immediate requirements and was recommended as a satisfactory, inter solution. (Author)
AD-657 118 HC$3.00 MF$0.65

DENSITY FUNCTIONS FOR SOME RANDOM SUMS OF NORMAL, SINUSOIDAL, AND RAYLEIGH VARIABLES,
Naval Missile Center Point Mugu Calif
For primary bibliographic entry see Field 12A.
AD-657 121 HC$3.00 MF$0.65

RECEIVER NOISE FIGURE AS A FUNCTION OF INTERMEDIATE FREQUENCY,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
E. A. Beck. 21 Dec 56, 12p Rept no. CF-2608
Contract NOrd-7386

Descriptors: (*Radar receivers, *Noise (Radar)), Very low frequency, Low frequency, Degradation, Microwave equipment, Amplifiers, Measurement, Mixers (Electronics).

Data are presented on the noise figure of a microwave superheterodyne receiver for intermediate frequencies of 200 Kc to 14 mc. The receiver noise components are broken down to show the effect of increased crystal noise generation at lower intermediate frequencies. (Author)
AD-657 151 HC$3.00 MF$0.65

THE PROBABILITY OF OCCURRENCE OF RADAR ECHOES OVER AREAS OF ARBITRARY SIZE,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Isadore Katz. 16 Jan 57, 30p Rept no. CF-2616
Contract NOrd-7386
Prepared for presentation at the Annual Meeting of the Institute of Aeronautical Sciences (25th), January 30, 1957, IAS Preprint No. 720.

Descriptors: (*Meteorological radar, Statistical analysis), (*Atmospheric precipitation, Radar reflections), Radar echo areas, Probability.

Statistical data on weather echoes detected by ground-based radars are becoming available. The area of detectability of a radar may be of the order of 10,000 square miles. A method was developed for finding the amount of time these echoes will spend over a smaller sub-area of arbitrary size. The method utilizes the echo-size probability function, a steering-wind probability function and an assumption of the independence of echo size and echo speed. Illustrations are given for an X-band radar. (Author)
AD-657 153 HC$3.00 MF$0.65

UNIAXIAL ANISOTROPIC WALLS FOR SAME-SENSE CP REFLECTION.
Final technical rept.,
Ohio State Univ Columbus Electroscience Lab
J. J. H. Wang, and R. C. Rudduck. 15 Aug 67, 37p
Rept no. 2163-2
Contract NOw-66-0332

Descriptors: (*Radar corner reflectors, Design), Reflectivity, Dielectric properties, Metals, Bandwidth, Mechanical properties, Polarization, Backscattering, Electromagnetic waves.

The use of uniaxial anisotropic reflecting walls is investigated for reflectivity of same-sense circular polarization (SCP). Both dielectric-post and metallic-post media are considered. Experimental results are presented for a three metallic-post corner reflectors. The best current metallic-post design has the broadest SCP reflectivity yet measured. The bandwidth, mechanical tolerance, and fabrication properties of metallic-post walls are found to be excellent for application. (Author)
AD-657 201 HC$3.00 MF$0.65

THE RANDLE CLIFF RADAR DIGITAL RANGE-MEASURING INSTRUMENT.
Final rept.,
Naval Research Lab Washington D C
P. L. Watkins, and F. D. Clarke. 19 Jul 67, 35p
Rept no. NRL-6572

Descriptors: (*Radar equipment, *Range finding), Digital systems, Data, Pulse counters, Accuracy, Naval research laboratories, Phased arrays.

The Randle Cliff Radar (RCR) facility at the NRL Chesapeake Bay Division, which employs a 150-ft-diameter steerable antenna, uses digital data-acquisition techniques. In a complex of digital instrumentation, one instrument incorporates several noteworthy and unique features. The Digital Range-Measuring Instrument (DRAMI) is a multiple-mode radar-range digitizer. Though basically a gated-pulse counter capable of continuous readout of range information in either binary of BCD form, the DRAMI is unique in that unambiguous target range measurements are obtainable to a maximum range of 100,000 naut mi plus or minus 0.1 naut mi), even though the target lies beyond a number of radar interpulse periods. Another feature permits the accumulation, prior to readout, of several successive radar range values. The values are stored in the DRAMI register until a readout command is received, at which time display and recording are accomplished. Still another feature is the 'Test' mode of operation, in which all commands are internally generated and the DRAMI is, in a sense, made to check itself. In the event of improper operation, several key signals can be manually generated from the front panel, thus permitting the operator to pinpoint technical difficulties. The DRAMI is a versatile, reliable, and accurate device. It was specifically developed range studies of fast-moving or distant targets. However, the principles of its operation can be applied to meet the needs of any radar system. (Author)
AD-657 306 HC$3.00 MF$0.65

A STUDY OF FACTORS AFFECTING OPERATION OF THE VG REMOTE PPI,
Johns Hopkins Univ Baltimore Md Psychological Lab
W. R. Garner. 15 Aug 46, 38p
SPECDEVCEN-166-1-1
Contract N5ori-166 (01)

Descriptors: (*Plan position indicators, Operation), Radar equipment, Radar targets, Detection, Target discrimination, Gain, Voltage, Viewing screens, Cathode ray tubes, Intensity, Video signals, Performance (Engineering), Performance (Human).

The following conclusions were drawn from the results of these experiments. Detectibility improves as the video gain of the VG is increased. In general, detectibility is better with a more positive CRT bias. There is, however, an optimal CRT bias for every video gain setting. Clipping of the video signal in the PPI adapter unit does not seriously harm detectibility, although there are other disadvantages to such clipping. Increasing the accelerating voltage on the CRT decreases detectibility slightly, and considerably darkens the tube face. The reflected light intensity has no effect on detectibiblity over a wide range of intensities, both above and below the intensity normally used. Detectibility is better with the opal viewing screen than with the paper viewing screen. Under the optimal operating conditions of the VG, detectibility is approximately 1 decibel poorer than on the VF remote PPI. The higher the average detectibility, the less is the variability in the detectibility scores. The higher the video gain, the less is the variability in the detectibility scores. The more positive the CRT bias, the less is the variability in the detectibility. The reflected light intensity is the only factor which has any effect on discriminability, and that effect is very small. Range discrimination on both the VF and VG is alike for pulse lengths greater than 3 microseconds. For pulse lengths less then 3 microseconds, range discrimination is very slightly better on the VF than on the VG. (Author)
AD-657 477 HC$3.00 MF$0.65

THE SEARCH FACTOR IN DETECTING WEAK RADAR TARGETS.
Memo rept.,
Johns Hopkins Univ Baltimore Md Psychological Lab
S. B. Williams. 1 Jul 47, 12p
SPECDEVCEN-166-I-28
Contract N5ori-166 (01)

Descriptors: (*Radar targets, Detection), (*Radar operators, Performance (Human)), Radar scanning, Man-machine systems, Radar equipment, Phosphorescent materials, Noise (Radar), Display systems.

A laboratory investigation of the effect of size of area over which the radar operator searches for targets on the rapidity of detecting incoming targets is reported. Results of the investigation indicate that over very wide ranges of search area and for targets greater than ten degrees in lobe width there is no dependence of detectability on area of search, either for noise-free scopes or those cluttered with video noise. There is some evidence that for targets less than ten degrees in lobe width, however, area of search can be a significant, though relatively small factor in detectability, provided the target must be discriminated from a noise background. There are several implications of the

present data for radar practice and for rational treatments of effective radar ranges insofar as they involve an expression for probability of detection. The question is raised whether overall probability of detection might not be increased by the simultaneous use of two or more operators on a given scope. If this should be a genuine problem, its method of resolution will turn, among other things, on the size of the area-of-search factor.
AD-657 478 HC$3.00 MF$0.65

VISIBILITY ON CATHODE-RAY TUBE SCREENS: SIGNALS ON A P7 SCREEN SEEN AT DIFFERENT INTERVALS AFTER EXCITATION,
Johns Hopkins Univ Baltimore Md Dept of Psychology
For primary bibliographic entry see Field 20F.
AD-657 515 Not available from CFSTI.

VISIBILITY ON CATHODE-RAY TUBE SCREENS. SCREEN BRIGHTNESS,
Johns Hopkins Univ Baltimore Md
For primary bibliographic entry see Field 20F.
AD-657 520 Not available from CFSTI.

THEORY AND METHODS FOR ANALYZING ERRORS IN MAN-MACHINE SYSTEMS,
Johns Hopkins Univ Baltimore Md
For primary bibliographic entry see Field 5H.
AD-657 522 Not available from CFSTI.

18. NUCLEAR SCIENCES AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

ELECTRON TEMPERATURE VARIATION INDUCED EFFECTS AND LANDAU DAMPING OF ION ACOUSTIC WAVES,
Oak Ridge National Lab., Tenn.
I. Alexeff, W. D. Jones, and David Montgomery. Apr 67, 19p
Contract W-7405-eng-26
Revision of ORNL-P-2827.

Descriptors: (*Acoustics, *Sound), (*Electrons, Damping), Velocity, Thermonuclear reactions, Plasma physics, Helium, Xenon, Propagation.

For abstract, see NSA 21 16.
ORNL-4079 HC$3.00 MF$0.65

18B. Isotopes

THE SPIN AND BRANCHING OF THE 2750-keV LEVEL IN 37K,
California Inst of Tech Pasadena
For primary bibliographic entry see Field 20H.
AD-657 091 HC$3.00 MF$0.65

DEVELOPMENT OF 85 KR AS A UNIVERSAL TRACER.
Final rept. 1 Dec 64-30 Nov 66,
Parametrics, Inc., Waltham, Mass.
Orlando Cucchiara, and Philip Goodman. May 67, 30p
Contract AT (30-1)-2757

Descriptors: (*Krypton, *Radioactive isotopes), (*Nuclear industrial applications, *Tracer studies), Surface temperatures, Wear resistance, Feasibility studies.

For abstract, see NSA 21 16.
NYO-2757-6 HC$3.00 MF$0.65

TRITIUM AND OTHER ENVIROENTAL ISOTOPES IN THE HYDROLOGICAL CYCLE.
International Atomic Energy Agency, Vienna (Austria).
For primary bibliographic entry see Field 8D.
For abstract, see STAR 05 19.
N67-33469 HC$3.00 MF$0.65

NUCLEAR CHEMISTRY DIVISION ANNUAL REPORT, 1966,
California Univ., Berkeley. Lawrence Radiation Lab.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 21 16.
UCRL-17299 HC$3.00 MF$0.65

18C. Nuclear Explosions

CRATER, EJECTA, AND AIRBLAST STUDIES FROM FIVE HIGH-EXPLOSIVE CHARGES IN A HORIZONTAL SQUARE ARRAY,
Sandia Corp., Albuquerque, N. Mex.
C. Annette Rappleyea. Apr 67, 158p
Contract AT (29-1)-789

Descriptors: (*Nuclear explosions, *Cratering), (*Charges (Explosive), Distribution), Detonations, Soil mechanics, Mining engineering, Geology.

For abstract, see NSA 21 16.
SC-RR-66-480 HC$3.00 MF$0.65

STUDY OF THE MECHANICS OF SLIDE DAMS WITH SAND MODELS,
Michigan Technological Univ., Houghton. Dept. of Civil Engineering.
For primary bibliographic entry see Field 13B.
For abstract, see NSA 21 16.
SC-RR-67-24 HC$3.00 MF$0.65

THEORETICAL AMPLITUDES AND TRAVEL TIMES OF EXPLOSION-GENERATED SEISMIC P WAVES,
California Univ., Livermore. Lawrence Radiation Lab.
John Roberts. 5 Apr 67, 10p
Contract W-7405-eng-48

Descriptors: (*Seismic waves, *Nuclear explosions), (*Models (Simulations), *Seismology), Velocity.

For abstract, see NSA 21 16.
UCRL-50232 HC$3.00 MF$0.65

NUCLEAR EXPLOSIONS IN MISSISSIPPI PROJECTS SALMON AND STERLING,
California Univ., Livermore. Lawrence Radiation Lab.
Leo A. Rogers. 1 Jun 67, 8p

Descriptors: (*Nuclear explosions, Mississippi), (*Rock salt, Underground).

For abstract, see NSA 21 16.
UCRL-70470 HC$3.00 MF$0.65

18D. Nuclear Instrumentation

RADIOPHOTOLUMINESCENCE SPECTRA OF SILVER-ACTIVATED DOSIMETER GLASSES,
Naval Radiological Defense Lab San Francisco Calif
Klaus Becker, and Donald W. McQuilling. 25 Aug 67, 29p Rept no. USNRDL-TR-67-66

Descriptors: (*Dosimeters, Materials), (*Glass, *Luminescence), Emissivity, Continuous spectrum, Instrumentation, Photomultipliers, Silver, Annealing.

The absolute radiophotoluminescence spectra of several commercial and experimental Ag-activated dosimeter glasses were measured with a specially designed apparatus. Depending mainly on the glass base composition, maxima between 615 and 640 millimicrons and a slow decrease in the red were found. The effect of build-up, silver concentration and dose of the RPL spectral shape is small. The influence of very high doses and thermal annealing was also measured. (Author)
AD-656 896 HC$3.00 MF$0.65

COSMIC RAY OBSERVATIONS IN 1964-1965 WITH MARINER IV,
Iowa Univ Iowa City Dept of Physics and Astronomy
For primary bibliographic entry see Field 3B.
AD-656 916 HC$3.00 MF$0.65

OPERATION OF A SINGLE WEDGE GAP BETA RAY SPECTROMETER AND AN ON-LINE COMPUTER FOR THE MEASUREMENT OF SHORT LIVED BETA SPECTRA,
California Univ Los Angeles Dept of Physics
A. J. Armini, R. M. Polichar, and J. W. Sunier. 30 May 66, 6p
Contract Nonr-233 (44)
Availability: Published in Nuclear Instruments and Methods v48 p309-14 1967.

Descriptors: (*Beta-ray spectroscopy, Instrumentation), Nuclear radiation spectrometers, Computers, Beta decay, Measurement, Computer programs.

A system designed to measure the beta spectra of short lived isotopes with energies up to 15 MeV is discussed. It makes use of the focusing properties of a single wedge gap spectrometer and of the data acquisition and processing facility of an on-line SDS 925 computer. The separation of the data in their component half-lives and their normalization is discussed. An application to the beta decay of 24Al and 24mAl is presented. (Author)
AD-657 104 Not available from CFSTI.

THE SOLAR X-RAY FLARE OF 7 JULY 1966,
Iowa Univ Iowa City Dept of Physics and Astronomy
For primary bibliographic entry see Field 3B.
AD-657 186 HC$3.00 MF$0.65

NEUTRON FLUX DISTRIBUTION FROM A 14 MeV NEUTRON GENERATOR,
Army Materials Research Agency Watertown Mass
H. F. Priest, F. C. Burns, and G. L. Priest. 15 Aug 66, 14p Rept no. AMRA-TR-67-23
Availability: Published in Nuclear Instruments and Methods v50 p141-6 1967.

Descriptors: (*Neutron beams, Instrumentation), (*Neutron flux, Measurement), Radiation measurement systems, Particle accelerator targets, Photographic analysis.
Identifiers: Neutron sources.

In order to carry out accurate activation analyses using a neutron generator employing the 3H (d,n)4He reaction, it is important to know the neutron flux distribution relative to the tritium target. Methods were developed for determining this flux distribution and typical examples are presented. (Author)
AD-657 406 Not available from CFSTI.

THE LINEARITY OF THE CHARGE CONVERSION FUNCTION FOR COOLED LITHIUM-DRIFTED SILICON DETECTORS IN RESPONSE TO X-RAY AND LOW ENERGY GAMMA RAY EXCITATION,
Stanford Univ Calif High Energy Physics Lab
H. R. Zulliger, and D. W. Aitken. 1967, 9p Rept no. HEPL-467
AFOSR-67-1948
Contract AF 49 (638)-1499
Availability: Published in IEEE Trans. Nucl. Sci. NS-14 p563-8 1967.

Descriptors: (*X-ray spectroscopy, Instrumentation), (*Semiconductor devices, Crystal counters), (*Crystal counters, Performance (Engineering)), X rays, Gamma rays, Silicon, Impurities, Lithium, Photoelectric effect, Excitation, Emissivity, Resolution.

The linearity of the collected charge/keV has been determined as a function of energy between 4.9 and 75 keV for cooled lithium-drifted silicon detectors. Nonlinear effects for applied field intensities up to 1 kV/cm have been observed to extend to photon energies above 30 keV. Extrapolation to infinite fields does not remove the nonlinear response at low energies. The charge conversion factor appears to be independent of energy within 0.2% down to 10 keV. (Author)
AD-657 524 Not available from CFSTI.

THE FLUORESCENT RESPONSE OF NaI (Tl), CsI (Tl), CsI (Na) AND CaF2 (Eu) TO X-RAYS AND LOW ENERGY GAMMA RAYS,
Stanford Univ Calif High Energy Physics Lab
D. W. Aitken, B. L. Beron, G. Yenicay, and H. R. Zulliger. 1967, 12p Rept no. HEPL-478
AFOSR-67-1932
Contract AF 49 (638)-1499
Availability: Published in IEEE Trans. Nucl. Sci ns-14 p468-76 1967.

Descriptors: (*X-ray spectroscopy, Instrumentation), (*Scintillation counters, Performance (Engineering)), Crystals, Sodium compounds, Cesium compounds, Iodides, Calcium fluorides, Impurities, Thallium, Europium, Excitation, X rays, Gamma rays, Fluorescence, Resolution.
Identifiers: Sodium iodide, Cesium iodide.

The fluorescent response functions of NaI (Tl), CsI (Tl), CsI (Na) and CaF2 (Eu) have been determined with thin crystals over the energy range from 3.3 to 840 keV. A pronounced nonlinear dependence on photon energy was observed in this region for all four types of crystals investigated. Qualitatively the response functions for NaI (Tl), CsI (Tl) and CsI (Na) are similar down to a photon energy of about 20 keV, but major differences are observed at lower energies. The response function of CaF2 (Eu) is very different from the response functions for the other three crystals over the entire energy range examined. Both K-shell and L-shell absorption edge discontinuities are evident in the fluorescent response curves for NaI (Tl) and CsI (Tl). Only K-shell absorptions edge discontinuities could be observed in the response curves for CsI (Na) and CaF2 (Eu). A nonlinear fluorescent dependence on electron energy is indicated for all four types of crystals. Discontinuities in the spectral resolution function are observed in NaI (Tl) at energies corresponding to both the K-shell and L-shell absorption edges of iodine. A shift toward longer wavelengths in the light spectrum emitted by NaI (Tl) in response to excitation by X-rays with energies below about 10 keV may also be indicated by photomultiplier-dependent differences observed only at the lowest energies. (Author)
AD-657 525 Not available from CFSTI.

REACTOR PHYSICS DIVISION ANNUAL REPORT, JULY 1, 1965 TO JUNE 30, 1966.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 16.
ANL-7210 HC$3.00 MF$0.65

RADIATION SAFETY TECHNICIAN TRAINING COURSE,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 16.
ANL-7291 HC$3.00 MF$0.65

HIGH-TEMPERATURE LIQUID-METAL TECHNOLOGY REVIEW. A BIMONTHLY TECHNICAL PROGRESS REVIEW.
Brookhaven National Lab., Upton, N. Y.
For primary bibliographic entry see Field 20M.
For abstract, see NSA 21 16.
BNL-50048 HC$3.00 MF$0.65

11 B BETA CURRENT THERMAL NEUTRON FLUX DETECTOR,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
C. N. Jackson, Jr. Apr 67, 30p
Contract AT (45-1)-1830

Descriptors: (*Radiation measurement systems, *Thermal neutrons), (*Neutron flux, *Reactor cores), Detectors, Rhodium, Shielding.

For abstract, see NSA 21 16.
BNWL-395 HC$3.00 MF$0.65

ANNUAL PROGRESS REPORT FOR THE PERIOD JULY 1965 THROUGH JUNE 1966.
New Brunswick Lab. (AEC), N. J.
Feb 67, 102p

Descriptors: (*Spectrophotometers, Chemical analysis), (*Boron, Recovery, Molybdenum, Tungsten, Stainless steel, Sodium.

For abstract, see NSA 21 16.
NBL-237 HC$3.00 MF$0.65

ANNUAL REPORT ON RESEARCH PROJECT.
Columbia Univ., New York. Radiological Research Lab.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 16.
NYO-2740-4 HC$3.00 MF$0.65

A NEW METHOD OF COMPARING THE PERFORMANCE OF NEUTRON MONITORS.
Uppsala Univ. (Sweden). Inst. of Physics.
For primary bibliographic entry see Field 4A.
For abstract, see STAR 05 19.
N67-33353 HC$3.00 MF$0.65

MONTE CARLO CODE FOR SOLUTION OF PLANAR ELECTRON-DIODE PROBLEMS INCLUDING ELECTRON- NEUTRAL ELASTIC COLLISIONS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 20H.
For abstract, see STAR 05 19.
N67-33639 HC$3.00 MF$0.65

HANDBOOK OF RECORDING INSTRUMENTS FOR IONIZING RADIATION.
Israel Program for Scientific Translations, Ltd., Jerusalem.
M. E. Egorov, A. F. Lazarev, N. L. Pervo, A. A. Timofeev, and V. S. Zhernov. 1967, 468p AEC-TR-6709
Transl. Into English of the Book "apparatura Dlya Registratsii I Issledovaniya Ioniziruyushchikh Izluchenii" Moscow, Atomizdat, 1965 Published for Aec and Nsf

Descriptors: *Handbook, *Ionizing radiation, *Recording instrument, Chamber, Characteristics, Counter, Detector, Discharge, Dosimeter, Electronic, Equipment, Gas, Instrument, Ionization, Ionizing, Monitor, Nuclear, Photomultiplier, Physics, Radiation, Recording, Scintillator, Spectrometer, U.S.S.R..

For abstract, see STAR 05 19.
N67-33748 HC$3.00 MF$0.65

NUCLEAR CHEMISTRY DIVISION ANNUAL REPORT, 1966,
California Univ., Berkeley. Lawrence Radiation Lab.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 21 16.
UCRL-17299 HC$3.00 MF$0.65

18E. Nuclear Power Plants

CONTROL OF A NUCLEAR REACTOR WITH A GASEOUS CONTROL SYSTEM.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
H. W. Davison, C. A. Heath, and W. Lowen. Aug 67, 71p NASA-TN-D-4093
Contract 128-28-03-05-22

Descriptors: *Control system, *Helium 3, *Water moderated reactor, Absorption, Coefficient, Control, Depression, Flux, Gas, Moderation, Neutron, Nuclear, Power, Reactor, Stability, System, Thermal, Water.

For abstract, see STAR 05 19.
N67-33445 HC$3.00 MF$0.65

18F. Radiation Shielding and Protection

REACTOR PHYSICS DIVISION ANNUAL REPORT, JULY 1, 1965 TO JUNE 30, 1966.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 16.
ANL-7210 HC$3.00 MF$0.65

ULTRA HIGH TEMPERATURE REACTOR EXPERIMENT (UHTREX) FACILITY DESCRIPTION AND SAFETY ANALYSIS REPORT.
Revised ed.
Los Alamos Scientific Lab., N. Mex.
Sep 66, 541p
Contract W-7405-eng-36
Descriptors: (*Reactor safety systems, Reports), (*High-temperature research, *Reactor fuel elements), Reactor coolants.

For abstract, see NSA 21 16.
LA-3556 (Rev.) HC$3.00 MF$0.65

ELECTRON SHIELDING STUDIES TECHNICAL PROGRESS REPORT, 1 NOV. 1965 - 31 MAR. 1966.
General Dynamics Corp., San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
W. Hunter, C. Jupiter, G. Merkel, and R. Scalettar. 8 Apr 66, 38p NASA-CR-87143, GACD-7080
Contract NAS8-11304

Descriptors: *Electron scattering, *Emission spectrum, *Radiation shielding, *Scattering cross section, Beam, Bombardment, Bremsstrahlung, Chamber, Cross section, Eigenfunction, Electron, Emission, Energy, Equation, Radiation, Scattering, Shielding, Spectroscopy, Spectrum, Transport.

For abstract, see STAR 05 19.
N67-33567 HC$3.00 MF$0.65

18G. Radioactive Wastes and Fission Products

FIXATION OF RADIOACTIVE RESIDUES.
Research and development activities quarterly progress rept. Oct-Dec 66,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
A. M. Platt. Apr 67, 28p
Contract AT (45-1)-1830

Descriptors: (*Radioactive waste, Thermal conductivity), (*Radioactivity, *Decontamination).

For abstract, see NSA 21 16.
BNWL-410 HC$3.00 MF$0.65

FIXATION OF RADIOACTIVE RESIDUES.
Research and development activities quarterly progress rept. Jan-Mar 67,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
A. M. Platt. Jun 67, 29p
Contract AT (45-1)-1830

Descriptors: (*Radioactive waste, Processing), (*Cesium, Radioactive waste), Storage, Ion exchange, Handling.

For abstract, see NSA 21 16.
BNWL-434 HC$3.00 MF$0.65

NUCLEAR CHEMISTRY DIVISION ANNUAL REPORT, 1966,
California Univ., Berkeley. Lawrence Radiation Lab.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 21 16.
UCRL-17299 HC$3.00 MF$0.65

IDENTIFICATION OF IMPORTANT FISSION PRODUCT NUCLIDES FOR RADIOLOGICAL DOSE CALCULATIONS FOLLOWING A 235 U-FUELED REACTOR ACCIDENT,
Bettis Atomic Power Lab., Pittsburgh, Pa.
D. R. Connors, H. J. Litke, and D. S. Rampolla.
Feb 67, 123p
Contract AT (11-1)-GEN-14

Descriptors: (*Fission products, *Radiological dosage), (*Reactor accidents, *Reactor fuels), Radioactive isotopes, Uranium, Identification.

For abstract, see NSA 21 16.
WAPD-TM-599 HC$3.00 MF$0.65

YANKEE CORE EVALUATION PROGRAM.
Quarterly progress rept. for the period ending 30 Sep 66,
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
M. J. O'Boyle. Apr 67, 147p
Contract AT (30-1)-3017

Descriptors: (*Reactor cores, *Fuel burn up), Reactor system components, Reactor lattice parameters, Reactor fuel rods.

For abstract, see NSA 21 16.
WCAP-6082 HC$3.00 MF$0.65

18H. Radioactivity

FIELD EXPEDIENTS FOR DECONTAMINATING WATER CONTAINING NUCLEAR BOMB DEBRIS,
Army Engineer Research and Development Labs Fort Belvoir Va
Don C. Lindsten, and Maurice Pressman. Jul 67, 47p Rept no. AERDL-1904

Descriptors: (*Water supplies, *Decontamination), (*Radiological contamination, Water supplies), Fission products, Solubility, Separation, Colloids, Liquid filters, Dosimeters.

A description is given of work which yielded the following results: (a) the solubility of radioactive debris in water increases with a decrease in pH and an increase in temperature, but the change is not significant in the range of pH and temperature variations of normal drinking water supplies; (b) the solubility of radioactive debris in water is not markedly affected by contact time (increases in solubility with time are offset by decreases in contamination resulting from radioactive decay); (c) the solubility of radioactive debris in water may be significant enough to require demineralization to produce water safe for drinking; (d) radioactive debris from surface detonations can be colloidal and remain in suspension in water for extended periods of time and be readily transported to downstream water sources; (e) field expedient water purification methods such as filtration through clay, paper, cellulose pads, and molded filter candles; and batch coagulation and filtration can effectively accomplish radioactivity removals of about 75 percent or more. Higher removals of activity approaching 100 percent are obtainable by ion exchange demineralization following filtration; (f) the standard military IM-141/PDR-27J Radiacmeter and the Civil Defense CDV-700 meter can be used satisfactorily in the field to determine the radioactivity content of water at levels higher than 1,000,000 picocuries per liter. (Author)
AD-656 930 HC$3.00 MF$0.65

THE g-FACTOR OF THE 305 keV STATE OF 48V,
Bonn Univ (West Germany) Institut Fuer Strahlen-Und Kernphysik
E. Bodenstedt, H. W. Flender, K. Auerbach, J. Braunsfurth, and M. Maier. 31 Oct 66, 17p
AFOSR-67-1838
Grant AF-EOAR-59-65
Prepared in cooperation with Hamburg Univ. (West Germany).
Availability: Published in Nuclear Physics vA94 p427-41 1967.

Descriptors: (*Vanadium, *Nuclear energy levels), Odd-odd nuclei, Chromium, Decay schemes, Half life, Nuclear spins, Magnetic fields, Nuclear magnetic moments, Gamma-ray spectra, West Germany.

The g-factor of the 305 keV state of the doubly odd nucleus V48 was determined by observing the rotation of the 116 keV 305 keV angular correlation in strong external magnetic fields. Liquid sources as well as Cr 48 sources embedded in the lattice of metallic copper were used for these measurements. A slight attenuation of the angular correlation was found for the liquid source, whereas the metallic source seemed not to produce an attenuation. Within the limits of error of this experiment the same rotation was found for both sources. The result g = +0.188 plus or minus 0.017 is discussed in the framework of the shell model as well as the Nilsson model. The half-life of the 305 keV state was redetermined as T1/2 = 7.09 plus or minus 0.07ns. The 116 keV 305 keV gamma gamma-angular correlation confirms the previous spin and multipolarity assignments. (Author)
AD-657 046 Not available from CFSTI.

RADIATION DAMAGE TO ORBITING SOLAR CELLS AND TRANSISTORS.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 10B.
AD-657 155 HC$3.00 MF$0.65

RADIATION DAMAGE IN SEMICONDUCTORS.
Ecole Normale Superieure Paris (France) Laboratoire de Physique
For primary bibliographic entry see Field 20L.
AD-657 365 HC$3.00 MF$0.65

PHYSICS MEASUREMENTS IN TUNGSTEN-BASED, ALUMINUM-REFLECTED FAST REACTORS,
Argonne National Lab., Ill.
R. C. Doerner, W. G. Knapp, and K. K. Almenas. Mar 67, 38p
Contract W-31-109-eng-38

Descriptors: (*Fast reactors, *Tungsten), (*Reactor cores, *Aluminum), (*Critical assemblies, *Reactor reactivity), Reflectors, Reactor materials, Reactor fuels.

For abstract, see NSA 21 16.
ANL-7007 HC$3.00 MF$0.65

REACTOR PHYSICS DIVISION ANNUAL REPORT, JULY 1, 1965 TO JUNE 30, 1966.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 16.
ANL-7210 HC$3.00 MF$0.65

A POISON-FREE LOADING OF UO 2 AND PU-AL IN THE PRCF WITH D2O-MODERATOR,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
V. O. UOTINEN. May 67, 14p
Contract AT (45-1)-1830

Descriptors: (*Reactor lattice parameters, *Reactor moderators), (*Critical assemblies, *Reactor fuel elements), Uranium compounds, Oxides, Plutonium, Aluminum.

For abstract, see NSA 21 16.
BNWL-372 HC$3.00 MF$0.65

REACTOR PHYSICS DEPARTMENT TECHNICAL ACTIVITIES QUARTERLY REPORT, OCTOBER, NOVEMBER, DECEMBER 1966.
Batelle-Northwest, Richland, Wash. Pacific Northwest Lab.
15 Apr 67, 66p
Contract AT (45-1)-1830

Descriptors: (*Thermal reactors, Nuclear engineering), (*Fast reactors, *Reactor theory), (*Wave functions, *Elastic scattering), Programming (Computers), Shielding.

For abstract, see NSA 21 16.
BNWL-400 HC$3.00 MF$0.65

NEUTRON MULTIPLICATION EXPERIMENT WITH 238 PU DIOXIDE DOUBLE SEALED IN CALORIMETER PRESSURE CONTAINERS,
Mound Lab., Miamisburg, Ohio.
R. A. Wolfe, D. A. Edling, and D. F. Giessing.
9 Jan 67, 16p
Contract AT (33-1)-GEN-53

Descriptors: (*Plutonium compounds, Dioxides), (*Radioactive isotopes, *Containers), Multiplication factor, Calorimeters, Seals.

For abstract, see NSA 21 16.
MLM-1395 HC$3.00 MF$0.65

NUCLEAR CHEMISTRY DIVISION ANNUAL REPORT, 1966,
California Univ., Berkeley. Lawrence Radiation Lab.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 21 16.
UCRL-17299 HC$3.00 MF$0.65

18I. Reactor Engineering and Operation

PHYSICS MEASUREMENTS IN TUNGSTEN-BASED, ALUMINUM-REFLECTED FAST REACTORS,
Argoone National Lab., Ill.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 16.
ANL-7007 HC$3.00 MF$0.65

REACTOR PHYSICS DIVISION ANNUAL REPORT, JULY 1, 1965 TO JUNE 30, 1966.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 16.
ANL-7210 HC$3.00 MF$0.65

HYDRODYNAMICS OF A NEW CONCEPT OF PRIMARY CONTAINMENT BY ENERGY ABSORPTION,

Argonne National Lab., Ill.
H. C. Sorrensen, and S. H. Fistedis. Dec 66, 141p
Contract W-31-109-eng-38

Descriptors: (*Containment, *Hydrodynamics), (*Reactor operation, *Nuclear power plants), Energy, Absorption.

For abstract, see NSA 21 16.
ANL-7214 HC$3.00 MF$0.65

RADIATION SAFETY TECHNICIAN TRAINING COURSE,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 16.
ANL-7291 HC$3.00 MF$0.65

PRESSURE DROP IN GEOMETRICALLY ORDERED PACKEDBEDS OF SPHERES,
Brookhaven National Lab., Upton, N. Y.
H. Susskind, and W. Becker. Jun 66, 70p

Descriptors: (*Fast reactors, *Reactor fuel elements), (*Reynolds number, *Spheres), Nuclear engineering, Reactor materials.

For abstract, see NSA 21 16.
BNL-50016 HC$3.00 MF$0.65

HIGH-TEMPERATURE LIQUID-METAL TECHNOLOGY REVIEW. A BIMONTHLY TECHNICAL PROGRESS REVIEW.
Brookhaven National Lab., Upton, N. Y.
For primary bibliographic entry see Field 20M.
For abstract, see NSA 21 16.
BNL-50048 HC$3.00 MF$0.65

A POISON-FREE LOADING OF UO 2 AND PU-AL IN THE PRCF WITH D2O-MODERATOR,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 16.
BNWL-372 HC$3.00 MF$0.65

11 B BETA CURRENT THERMAL NEUTRON FLUX DETECTOR,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 16.
BNWL-395 HC$3.00 MF$0.65

REACTOR PHYSICS DEPARTMENT TECHNICAL ACTIVITIES QUARTERLY REPORT, OCTOBER, NOVEMBER, DECEMBER 1966.
Batelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 16.
BNWL-400 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS, VOLUME 7, NUMBER 3,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
Barbara G. Russell. 31 Mar 67, 40p
Contract AT (45-1)-1830

Descriptors: (*Plutonium, Abstracts), Biology, Medicine, Chemistry, Health physics, Metallurgy, Ceramic materials, Safety, Physics, Nuclear engineering.

For abstract, see NSA 21 16.
BNWL-423 HC$3.00 MF$0.65

NEUTRON NOISE, WAVES, AND PULSE PROPAGATION.
Florida Univ., Gainesville.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 16.
CONF-660206 HC$3.00 MF$0.65

FEASIBILITY STUDY OF AN ACCELERATOR-BOOSTER, FAST, PULSED RESEARCH REACTOR.
General Dynamics Corp., San Diego, Calif. General Atomic Div.
For primary bibliographic entry see Field 20G.
For abstract, see NSA 21 16.
GA-7381 HC$3.00 MF$0.65

AN ANALYSIS OF NUCLEAR POWER PLANT OPERATING AND SAFETY EXPERIENCE,
Holmes and Narver, Inc., Los Angeles, Calif. Nuclear Div.
B. J. Garrick, W. C. Gekler, and H. P. Pomrehn.
15 Dec 66, 389p
Contract AT (04-3)-587

Descriptors: (*Nuclear power plants, *Reactor operation), (*Reactor safety systems, *Nuclear engineering).

For abstract, see NSA 21 16.
HB-185-Vol-2-Bk-2 HC$3.00 MF$0.65

AN ANALYSIS OF NUCLEAR POWER PLANT OPERATING AND SAFETY EXPERIENCE,
Holmes and Narver, Inc., Los Angeles, Calif. Nuclear Div.
B. J. Garrick, W. C. Gekler, and H. P. Pomrehn.
15 Dec 66, 118p
Contract AT (04-3)-587

Descriptors: (*Nuclear power plants, *Reactor operation), (*Reactor safety systems, *Nuclear engineering), Power reactors, Reactor fuels.

For abstract, see NSA 21 16.
HN-185-VOL-I HC$3.00 MF$0.65

AN ANALYSIS OF NUCLEAR POWER PLANT OPERATING AND SAFETY EXPERIENCE,
Holmes and Narver, Inc., Los Angeles, Calif. Nuclear Div.
B. J. Garrick, W. C. Gekler, and H. P. Pomrehn.
15 Dec 66, 440p
Contract AT (04-3)-587

Descriptors: (*Nuclear power plants, *Reactor operation), (*Reactor safety systems, *Nuclear engineering).

For abstract, see NSA 21 16.
HN-185-Vol-2-Bk-1 HC$3.00 MF$0.65

NONDESTRUCTIVE FLAW DETECTION BY USE OF ACOUSTIC EMISSIONS,
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
D. L. Parry. Apr 67, 44p
Contract AT (10-1)-205

Descriptors: (*Defects (Materials), Non-destructive testing), (*Acoustic detectors, Emissivity), Nuclear power plants, Reactor safety systems, Radiography, Ultrasonic radiation.

For abstract, see NSA 21 16.
IDO-17230 HC$3.00 MF$0.65

RETENTION OF IODINE ON SELECTED PARTICULATE FILTERS AND A POROUS SILVER MEMBRANE BEING CONSIDERED FOR THE LOFT MAYPACK,
Idaho Nuclear Corp., Idaho Falls.
J. H. Keller, F. A. Duce, and F. O. Cartan. May 67, 15p
Contract AT (10-1)-1230

Descriptors: (*Iodine, Retention), (*Membranes, *Filters (Fluid)), Exposure, Efficiency.

For abstract, see NSA 21 16.
IN-1078 HC$3.00 MF$0.65

ULTRA HIGH TEMPERATURE REACTOR EXPERIMENT (UHTREX) FACILITY DESCRIPTION AND SAFETY ANALYSIS REPORT.
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 18F.
For abstract, see NSA 21 16.
LA-3556 (Rev.) HC$3.00 MF$0.65

DEVELOPMENT OF CALCULATIONAL METHODS FOR FAST REACTOR SAFETY ANALYSIS AT LASL,
Los Alamos Scientific Lab., N. Mex.
Carl A. Anderson, Jr. 24 Apr 67, 22p
Contract W-7405-eng-36

Descriptors: (*Fast reactors, *Reactor safety systems), (*Equations of state, *Programming (Computers)).

For abstract, see NSA 21 16.
LA-3683 HC$3.00 MF$0.65

GAMMA AND NEUTRON FLUXES IN THE DOUNREAY FAST REACTOR.
United Kingdom Atomic Energy Authority, Dounreay (Scotland). Reactor Group.
H. Atkinson, and A. G. Edwards. 6 Oct 66, 22p
TRG-1429

Descriptors: *Fast reactor, *Gamma radiation, *Neutron flux, Calculation, Design, Distribution, Fast, Flux, Gamma, Modification, Neutron, Profile, Radiation, Rate, Reaction, Reactor.

For abstract, see STAR 05 19.
N67-33681 HC$3.00 MF$0.65

INVESTIGATION OF THE ECONOMICS OF REGENERATIVE FEEDWATER HEATING IN DUAL-PURPOSE NUCLEAR DESALINATION PLANTS,
Oak Ridge National Lab., Tenn.
J. C. Moyers. Jul 66, 15p
Contract W-7405-eng-26

Descriptors: (*Distilling plants, *Desalination), (*Nuclear power plants, Economics).

For abstract, see NSA 21 16.
ORNL-TM-1563 HC$3.00 MF$0.65

INDEX OF PROCEEDINGS OF REMOTE SYSTEMS TECHNOLOGY DIVISION OF AMERICAN NUCLEAR SOCIETY, VOLUMES 1-14,
Sandia Corp., Albuquerque, N. Mex.
R. M. Jefferson. May 67, 74p
Contract AT (29-1)-789

Descriptors: (*Indexes, Documentation), (*Remote control systems, Nuclear physics), Subject indexing, Nuclear engineering.

For abstract, see NSA 21 16.
SC-R-67-1056 HC$3.00 MF$0.65

IDENTIFICATION OF IMPORTANT FISSION PRODUCT NUCLIDES FOR RADIOLOGICAL DOSE CALCULATIONS FOLLOWING A 235 U-FUELED REACTOR ACCIDENT,
Bettis Atomic Power Lab., Pittsburgh, Pa.
For primary bibliographic entry see Field 18G.
For abstract, see NSA 21 16.
WAPD-TM-599 HC$3.00 MF$0.65

REACTOR SAFETY ANALYSIS,
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
S. N. Ehrenpreis, and J. D. McAdoo. Apr 66, 171p
Contract AT (30-1)-3269

Descriptors: (*Reactor safety systems, *Nuclear engineering), (*Reactor fuel rods, *Reactor coolants), Reactor operation, Radioactivity.

For abstract, see NSA 21 16.
WCAP-3269-60 HC$3.00 MF$0.65

YANKEE CORE EVALUATION PROGRAM.
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
For primary bibliographic entry see Field 18G.
For abstract, see NSA 21 16.
WCAP-6082 HC$3.00 MF$0.65

18J. Reactor Materials

CORROSION STUDIES OF HAYNES 25 ALLOY IN SEAWATER USING ELECTROCHEMICAL TECHNIQUES,
Naval Radiological Defense Lab San Francisco Calif
For primary bibliographic entry see Field 11F.
AD-656 897 HC$3.00 MF$0.65

STUDY OF NUCLEAR SEEDED MHD PLASMAS.
Florida Univ Gainesville Dept of Nuclear Engineering Sciences
For primary bibliographic entry see Field 20I.
AD-657 199 HC$3.00 MF$0.65

PHYSICS MEASUREMENTS IN TUNGSTEN-BASED, ALUMINUM-REFLECTED FAST REACTORS,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 16.
ANL-7007 HC$3.00 MF$0.65

REACTOR PHYSICS DIVISION ANNUAL REPORT, JULY 1, 1965 TO JUNE 30, 1966.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 16.
ANL-7210 HC$3.00 MF$0.65

HYDROGEN EMBRITTLEMENT IN IRRADIATED STEELS,
Argonne National Lab., Ill.
A. D. Rossin. Feb 67, 73p
Contract W-31-109-eng-38

Descriptors: (*Hydrogen embrittlement, Steel), (*Nuclear radiation, *Pressure vessels), Dosimeters.

For abstract, see NSA 21 16.
ANL-7266 HC$3.00 MF$0.65

GEL-ADDITION PROCESS CHEMICAL STUDIES.
Quarterly progress rept. no. 3, Jan-Mar 67,
Babcock and Wilcox Co., Lynchburg, Va. Research and Development Div.
E. H. Dewell. Mar 67, 53p
Contract AT (30-1)-3714

Descriptors: (*Gels, *Reactor fuels), (*Plutonium compounds, *Uranium compounds), Mixtures, Oxides, Microstructure.

For abstract, see NSA 21 16.
BAW-3714-3 HC$3.00 MF$0.65

BEHAVIOR OF FUEL CLADDINGS UNDER LOAD AND WITH THERMAL CYCLING IN SODIUM,
Brookhaven National Lab., Upton, N. Y.
H. Susskind, and W. Becker. Jun 66, 22p

Descriptors: (*Reactor fuel cladding, *Fast reactors), (*Reactor fuels, *Cermets), Sodium, Sintering, Stainless steel, Load distribution, Particles, Interactions.

For abstract, see NSA 21 16.
BNL-50010 HC$3.00 MF$0.65

PRESSURE DROP IN GEOMETRICALLY ORDERED PACKEDBEDS OF SPHERES,
Brookhaven National Lab., Upton, N. Y.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 16.
BNL-50016 HC$3.00 MF$0.65

IRRADIATION PROPERTIES OF HIGH ENERGY RATE PNEUMATICALLY IMPACTED UO2-PUO2 FUELS,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
W. J. Bailey, and M. D. Freshley. Apr 67, 40p
Contract AT (45-1)-1830

Descriptors: (*Reactor fuels, *Uranium compounds), (*Plutonium compounds, Oxides), Thermal reactors, Fast reactors, Particle size, Pneumatic systems, Impact.

For abstract, see NSA 21 16.
BNWL-356 HC$3.00 MF$0.65

A POISON-FREE LOADING OF UO 2 AND PU-AL IN THE PRCF WITH D2O-MODERATOR,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 16.
BNWL-372 HC$3.00 MF$0.65

REACTOR PHYSICS DEPARTMENT TECHNICAL ACTIVITIES QUARTERLY REPORT, OCTOBER, NOVEMBER, DECEMBER 1966.
Batelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 16.
BNWL-400 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS, VOLUME 7, NUMBER 3,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 16.
BNWL-423 HC$3.00 MF$0.65

FEASIBILITY STUDY OF AN ACCELERATOR-BOOSTER, FAST, PULSED RESEARCH REACTOR.
General Dynamics Corp., San Diego, Calif. General Atomic Div.
For primary bibliographic entry see Field 20G.
For abstract, see NSA 21 16.
GA-7381 HC$3.00 MF$0.65

HIGH-TEMPERATURE MATERIALS PROGRAMS, PART A.
Annual rept. no. 6, 31 Jan 66-31 Jan 67.
General Electric Co., Cincinnati, Ohio. Nuclear materials and propulsion operation.
31 Mar 67, 300p
Contract AT (40-1)-2847

Descriptors: (*Reactor materials, High-temperature research), (*Fast reactors, *Reactor fuel cladding), Radiation damage.

For abstract, see NSA 21 16.
GEMP-475A HC$3.00 MF$0.65

RECOVERY OF URANIUM FROM EBR-I CORE 2 MELTED FUEL,
Idaho Nuclear Corp., Idaho Falls.
M. E. Jacobson, R. R. Mascarenas, and G. F. Offutt. May 67, 17p
Contract AT (10-1)-1230

Descriptors: (*Uranium, Recovery), (*Reactor fuels, *Reactor cores), (*Breeder reactors, *Reactor coolants), Decontamination, Solvent extraction, Costs, Reactor fuel rods.

For abstract, see NSA 21 16.
IN-1088 HC$3.00 MF$0.65

ULTRA HIGH TEMPERATURE REACTOR EXPERIMENT (UHTREX) FACILITY DESCRIPTION AND SAFETY ANALYSIS REPORT.
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 18F.
For abstract, see NSA 21 16.
LA-3556 (Rev.) HC$3.00 MF$0.65

INVESTIGATION OF EMBRITTLEMENT OF REACTOR VESSEL STEELS THROUGH PLASTIC FATIGUE QUARTERLY REPORT, 1 APR. - 30 JUN. 1966.
Centre National de Recherches Metallurgiques, Liege (Belgium).
Dec 66, 22p EURAEC-1799, EUR-3339
Contract EURATOM-005-63-12 TEEB

Descriptors: *Embrittlement, *Fatigue, *Plastic, *Reactor material, *Steel, Bending, Biaxis, Environment, Forging, High temperature, Material, Measurement, Metallurgy, Moment, Reactor, Research, Testing, Vessel.

For abstract, see STAR 05 19.
N67-33838 HC$3.00 MF$0.65

USE OF PLUTONIUM AS A FUEL IN NUCLEAR REACTORS QUARTERLY REPORT, 1 JUL. - 30 SEP. 1966.
Societe Belge pour L Industrie Nucleaire, Brussels (Belgium).
Nov 66, 75p EURAEC-1774, QR-11
Contract EURATOM-001-64-1 TRUB
Prepared Jointly With Centre D'etude de l'Energie Nucleaire, Mol, Belgium

Descriptors: *Nuclear power plant, *Plutonium, *Reactor fuel, Application, Brass, Calculation, Calibration, Code, Computer, Dioxide, Distribution, Fabrication, Fuel, Fusion, Heterogeneity, Material, Neutron, Nuclear, Plant, Power, Radiation, Reaction, Reactor, Region, Rod, Spectrum, Technology, Test, Thermal, Uranium.

For abstract, see STAR 05 19.
N67-33861 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

ANNUAL PROGRESS SUMMARY (ON URANIUM FABRICATION), 1966.
Reactive Metals, Inc., Ashtabula, Ohio.
20 Apr 67, 100p
Contract AT (30-1)-1405

Descriptors: (*Uranium, Extrusion), (*Forging, Manufacturing methods), Reactor fuel cladding.

For abstract, see NSA 21 16.
RMI-8 HC$3.00 MF$0.65

YANKEE CORE EVALUATION PROGRAM.
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
For primary bibliographic entry see Field 18G.
For abstract, see NSA 21 16.
WCAP-6082 HC$3.00 MF$0.65

18K. Reactor Physics

PHYSICS MEASUREMENTS IN TUNGSTEN-BASED, ALUMINUM-REFLECTED FAST REACTORS,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 16.
ANL-7007 HC$3.00 MF$0.65

REACTOR PHYSICS DIVISION ANNUAL REPORT, JULY 1, 1965 TO JUNE 30, 1966.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 16.
ANL-7210 HC$3.00 MF$0.65

REACTOR PHYSICS DEPARTMENT TECHNICAL ACTIVITIES QUARTERLY REPORT, OCTOBER, NOVEMBER, DECEMBER 1966.
Batelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 16.
BNWL-400 HC$3.00 MF$0.65

PERT-IV, A TWO-DIMENSIONAL PERTURBATION CODE IN FORTRAN-IV,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
R. W. Hardie, and W. W. Little, Jr. Apr 67, 87p
Contract AT (45-1)-1830

Descriptors: (*Perturbation theory, Programming (Computers)), (*Two-dimensional flow, Programming languages).

For abstract, see NSA 21 16.
BNWL-409 HC$3.00 MF$0.65

DIFFERENTIAL NEUTRON THERMALIZATION.
Annual summary rept. 1 Oct 65-30 Sep 66.
General Dynamics Corp., San Diego, Calif. General Atomic Div.
10 Feb 67, 63p
Contract AT (04-3)-167

Descriptors: (*Neutron scattering, *Thermal neutrons), (*Nuclear particles, Thermal properties), Graphite, Nuclear reactors.

For abstract, see NSA 21 16.
GA-7439 HC$3.00 MF$0.65

18L. Reactors (Power)

HYDRODYNAMICS OF A NEW CONCEPT OF PRIMARY CONTAINMENT BY ENERGY ABSORPTION,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 16.
ANL-7214 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS, VOLUME 7, NUMBER 3,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 16.
BNWL-423 HC$3.00 MF$0.65

AN ANALYSIS OF NUCLEAR POWER PLANT OPERATING AND SAFETY EXPERIENCE,
Holmes and Narver, Inc., Los Angeles, Calif. Nuclear Div.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 16.
HB-185-Vol-2-Bk-2 HC$3.00 MF$0.65

AN ANALYSIS OF NUCLEAR POWER PLANT OPERATING AND SAFETY EXPERIENCE,
Holmes and Narver, Inc., Los Angeles, Calif. Nuclear Div.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 16.
HN-185-VOL-I HC$3.00 MF$0.65

AN ANALYSIS OF NUCLEAR POWER PLANT OPERATING AND SAFETY EXPERIENCE,
Holmes and Narver, Inc., Los Angeles, Calif. Nuclear Div.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 16.
HN-185-Vol-2-Bk-1 HC$3.00 MF$0.65

NRX/EST TRANSFER FUNCTION MEASUREMENTS BY CONTROL DRUM PERTURBATION AND COMPARISON WITH COMMON ANALYSIS MODEL PREDICTIONS.
Westinghouse Electric Corp., Pittsburgh, Pa. Astronuclear Lab.
G. H. Steiner. Nov 66, 136p NASA-CR-87373, WANL-TME-1475
Contract SNP-1

Descriptors: *Nuclear rocket, *Performance prediction, *Perturbation, *Transfer function, Analysis, Comparison, Computer, Control, Correlation, Cross, Design, Drum, Function, Measurement, Model, Nrx reactor, Nuclear, Performance, Prediction, Rocket, System, Test, Transfer.

For abstract, see STAR 05 19.
N67-33923 HC$3.00 MF$0.65

ORIC A FORTRAN IV CODE FOR COMPUTING OPTIMUM PLANT DESIGNS FOR THE DESALINATION OF SEAWATER AND THE PRODUCTION OF ELECTRICITY,
Oak Ridge National Lab., Tenn.
R. B. Winsbro. Aug 66, 120p
Contract W-7405-eng-26

Descriptors: (*Sea water, *Desalination), (*Electric power production, Programming (Computers)).

ORNL-TM-1523 HC$3.00 MF$0.65

INVESTIGATION OF THE ECONOMICS OF REGENERATIVE FEEDWATER HEATING IN DUAL-PURPOSE NUCLEAR DESALINATION PLANTS,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 16.
ORNL-TM-1563 HC$3.00 MF$0.65

YANKEE CORE EVALUATION PROGRAM.
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
For primary bibliographic entry see Field 18G.
For abstract, see NSA 21 16.
WCAP-6082 HC$3.00 MF$0.65

18M. Reactors (Non-Power)

REACTOR PHYSICS DIVISION ANNUAL REPORT, JULY 1, 1965 TO JUNE 30, 1966.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 16.
ANL-7210 HC$3.00 MF$0.65

FEASIBILITY STUDY OF AN ACCELERATOR-BOOSTER, FAST, PULSED RESEARCH REACTOR.
General Dynamics Corp., San Diego, Calif. General Atomic Div.
For primary bibliographic entry see Field 20G.
For abstract, see NSA 21 16.
GA-7381 HC$3.00 MF$0.65

18N. SNAP Technology

CORROSION STUDIES OF HAYNES 25 ALLOY IN SEAWATER USING ELECTROCHEMICAL TECHNIQUES,
Naval Radiological Defense Lab San Francisco Calif
For primary bibliographic entry see Field 11F.
AD-656 897 HC$3.00 MF$0.65

HIGH-TEMPERATURE LIQUID-METAL TECHNOLOGY REVIEW. A BIMONTHLY TECHNICAL PROGRESS REVIEW.
Brookhaven National Lab., Upton, N. Y.
For primary bibliographic entry see Field 20M.
For abstract, see NSA 21 16.
BNL-50048 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS, VOLUME 7, NUMBER 3,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 16.
BNWL-423 HC$3.00 MF$0.65

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

THE MEASUREMENT OF THE EXHAUST COMPOSITION OF SELECTED HELICOPTER ARMAMENT,
Army Aeromedical Research Unit Fort Rucker Ala
P. B. Scharf, B. B. Goshgarian, H. M. Nelson, and G. L. Hody. Jun 67, 49p Rept no. USAARU-67-10
AFRPL-TR-67-203

Descriptors: (*Helicopters, Hazards), (*Weapons, *Exhaust gases), (*Aircraft ammunition, Exhaust gases), (*Rockets, Exhaust gases), Poisonous gases, Predictions, Gas analysis, Infrared spectroscopy, Carbon monoxide, Nitrogen oxides, Ammonia, Carbon compounds, Sulfides, Hydrogen compounds, Cyanides, Lead, Copper, Automatic weapons, Flight crews.
Identifiers: Carbon oxysulfide, Hydrocyanic acid.

Crew members of armed helicopters are exposed to exhaust products of rapid fire machine guns and rockets. The exhaust composition of the weapons, needed for toxic hazard prediction, is difficult to obtain. In a joint Army-Air Force exploratory study, methods of analysis were evaluated and exhaust compositions for the 50 cal and 7.62mm machine gun and the 2.75 in. rocket were determined. A rapid scan infrared spectrophotometer was used

for immediate examination of effluent gases in order to detect reactive species. The exhaust gases were analyzed at concentrations as high as 1000 times those present in helicopters to minimize the chance of missing any significant toxic product. A qualitative and quantitative analysis of gas phase and aerosol components is given. It may well be that the proportion of carbon monoxide in the exhaust is so high that permissible exposure times can be selected on the basis of its concentration alone while still limiting exposures to all other toxic materials to safe levels. However, significant amounts of nitrogen dioxide, ammonia, carbonyl sulfide, hydrogen cyanide, lead and copper were found. (Author)
AD-655 844 HC$3.00 MF$0.65

AN ACTIVE FILTER FOR FUZE POWER SUPPLIES,
Harry Diamond Labs Washington D C
For primary bibliographic entry see Field 9E.
AD-656 926 HC$3.00 MF$0.65

METHYL CELLULOSE NITRATE.
Picatinny Arsenal Dover N J Propellants Lab
For primary bibliographic entry see Field 7C.
AD-657 214 HC$3.00 MF$0.65

19D. Explosions, Ballistics, and Armor

COMMENTS ON THE FUTURE STATE OF ORDNANCE SCIENCES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
F. N. Frenkiel. 2 Nov 56, 9p Rept no. CF-2591
Contract NOrd-7386

Descriptors: (*Ordnance, Scientific research), Predictions.

The Navy must try to have the best possible weapons, at present, in the near future, and in five to twenty years from now. The necessary efforts to have such weapons at present have been made. To have them in the near future technological improvements, for which new basic research is desirable but rarely required, may be sufficient. To develop the best weapons five to twenty years from now, however, the Navy must increase now its sources of basic knowledge.
AD-656 881 HC$3.00 MF$0.65

IONIZING DETONATION WAVES IN TRANSVERSE ELECTROMAGNETIC FIELDS,
Strathclyde Univ Glasgow (Scotland) Dept of Mathematics
For primary bibliographic entry see Field 20I.
AD-657 049 Not available from CFSTI.

AN EXPERIMENTAL METHOD FOR THE STUDY OF INTERACTIONS BETWEEN DETONATION WAVES AND MAGNETIC FIELDS.
California Univ Berkeley Office of Research Services
For primary bibliographic entry see Field 20C.
AD-657 354 HC$3.00 MF$0.65

THE AIR FORCE MATERIALS LABORATORY TERMINAL BALLISTIC RESEARCH FACILITY.
Summary rept.,
Dayton Univ Ohio Research Inst
Harold H. Hunt, and Robert F. Rolsten. Jul 67, 26p
AFML-TR-67-188
Contract F33615-67-C-1087

Descriptors: (*Ballistics, *Ranges (Establishments)), Projectiles, Velocity, Ammunition fragments, High-speed cameras, Stresses, Intensity, Small arms, Impact tests, Instrumentation.

The ballistic research facility described in this report was installed at Wright-Patterson Air Force Base for the Air Force Materials Laboratory by the Research Institute, University of Dayton. The facility has a capability for launching conventional small arms projectiles and simulated fragments with controlled velocities at targets of materials under investigation. Still cameras with high intensity, short duration (0.5 microsecond), light sources and high speed framing cameras provide photographic coverage of the impact event. Equipment has been provided to apply or simulate external stresses to a sheet or structural target during impact. (Author)
AD-657 378 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

20. PHYSICS

20A. Acoustics

TABLES OF SPHEROIDAL WAVE FUNCTIONS. PART 3. SECOND VOLUME OF OBLATE RADIAL FUNCTIONS OF THE FIRST AND SECOND TYPE,
Naval Research Lab Washington D C
For primary bibliographic entry see Field 12A.
AD-656 898 HC$3.00 MF$0.65

STUDIES IN MARINE GEOPHYSICS AND UNDERWATER SOUND FROM A DRIFTING ICE STATION.
Columbia Univ New York
For primary bibliographic entry see Field 8G.
AD-656 922 HC$3.00 MF$0.65

SOME DEEP-WATER SOUND-TRANSMISSION PATHS SOUTH OF CYPRUS. PART II. DIFFRACTION EFFECTS.
Technical rept.,
Woods Hole Oceanographic Institution Mass
Lincoln Baxter, II, and Robert Brockhurst. 15 Jun 66, 15p Rept no. WHOI-Ref-67-40, WHOI-Contrib-1802
Contract Nonr-4029 (00)
See also AD-611 691, pt. 1.
Availability: Published in The Journal of the Acoustical Society of America v40 n6 p1288-99 1966.

Descriptors: (*Sound transmission, *Underwater sound), Cyprus, Mediterranean Sea, Acoustics, Acoustic equipment, Graphics, Diffraction, Intensity.

Intensity and Fourier spectra of refracted and of bottom-reflected acoustic arrivals in the Mediterranean Sea south of Cyprus at ranges between 16 and 20.4 NM (nautical miles) are presented, together with the most probable sound-velocity profile and the near-surface temperature structure. The arrival structure and relationship between pulse travel time and range indicate that most of the 100- to 800-cps energy contributing to an arrival travels along paths similar to rays, but we find that, below 600 cps, there are frequency differences in the locations of these paths. The discovery of these frequency differences causes us to withdraw the postulate of scattering advanced in our first paper of this title and replace it with one of diffraction. According to Officer (Introduction to the Theory of Sound Transmission, McGraw-Hill Book Co., Inc., New York, 1958), Chap. 2, such differences can be caused by diffraction occurring at depths where the absolute value of (lambda sub o (delta c prime/c)) of the ratio of the fractional change delta c prime, in the velocity gradient over a wavelength, to the velocity gradient c/lambda sub o is largest. Our results indicate that the diffraction is observable in the convergence zone if (lambda sub o (delta c prime/c)) at such depths is approximately 5 x 10 to the -4 power or greater. (Author)
AD-656 951 Not available from CFSTI.

PHYSICAL ACOUSTICS,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
K. U. Ingard, L. W. Dean, III, R. H. Katyl, C. Krischer, and W. M. Manheimer. 1967, 10p
Contracts Nonr-1841 (42), DA-28-043-AMC-02536 (E)
Availability: Published in Research Lab. Quarterly Progress Rept. n86 p95-103.

Descriptors: (*Plasma medium, Sound signals), (*Wave transmission, Liquids), Mathematical analysis, Scattering, Phonons, Dynamics, Boundary value problems, Gases, Ions.

Contents: Possibility of radiation-induced sound amplification in a gas; Light scattering off surface wave phonons; Ion-density response to a rectangular pulse of sound in a plasma.
AD-657 100 Not available from CFSTI.

APPLICATION OF THE ANALYSIS OF VARIANCE TO MADIC DATA,
Naval Ship Research and Development Center Annapolis Md Annapolis Div
For primary bibliographic entry see Field 13I.
AD-657 128 HC$3.00 MF$0.65

FEASIBILITY OF A DIRECT EXPERIMENTAL TEST OF LIGHTHILL'S THEORY OF AERODYNAMIC SOUND USING FOCUSING TECHNIQUES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
S. A. Elder. 18 Jul 57, 33p Rept no. CF-2660
Contract NOrd-7386

Descriptors: (*Aerodynamic noise, Tests), Feasibility studies, Focusing, Jets, Subsonic flow, Sound signals, Turbulence, Theory.
Identifiers: Lighthill's theory.

A direct experimental test of Lighthill's theory of aerodynamically generated sound is found to be feasible if a suitable focusing device is used. By sampling the sound from a single correlation volume only, major theoretical problems could be overcome. Calculations were made for the case of sound produced in a single correlation volume in the downstream portion of an experimentally realizable subsonic jet. These show that the power level and frequency spectrum of the acoustic signal should be of such a nature that they could be adequately handled by the apparatus described. (Author)
AD-657 159 HC$3.00 MF$0.65

MEASUREMENT OF THE DISSIPATION ASSOCIATED WITH THE ELECTROMECHANICAL COUPLING IN PIEZOELECTRIC CERAMICS.

Navy Underwater Sound Lab New London Conn
For primary bibliographic entry see Field 11B.
AD-657 169 HC$3.00 MF$0.65

SUBHARMONIC GENERATION IN AN ACOUSTIC FABRY-PEROT INTERFEROMETER.
Technical rept.,
Michigan State Univ East Lansing Ultrasonics Lab
Jack A. Bamberg. 15 May 67, 50p Rept no. TR-16
Contract Nonr-2587 (01)

Descriptors: (*Interferometers, Acoustics), (*Harmonic generators, Acoustics), Transducers, Light, Diffraction, Ultrason radiation, Spectrum analyzers, Resonant frequency, Experimental design.
Identifiers: Subharmonic waves.

Above a certain energy density threshold in an intense ultrasonic standing wave, subharmonics of the driving frequency are sometimes present. To study this effect, an acoustic Fabry-Perot interferometer was constructed, consisting of two air-backed quartz transducers submerged in water. One of the transducers is driven at frequencies around its 3 MHz resonance. Electronic analysis of the waveforms present in the cavity is accomplished with a spectrum analyser connected to the other quartz transducer. Optical methods are used as a supplementary means of analysis. It was observed that subharmonics exist only at frequencies for which the cavity is in resonance and always occur in pairs, such that the sum of their frequencies is equal to the driving frequency. These discrete frequencies appear only in regions near integral sub-multiplies of the driving frequency. The pressure in the cavity at the onset of subharmonic oscillation may be as low as 1.5 atmosphere. In this study, subharmonics were obtained only when the cavity reflector had a frequency dependent reflection coefficient. (Author)
AD-657 185 HC$3.00 MF$0.65

TRANSMISSION AND REFLECTION OF SOUND IN A MEDIA CONTAINING DISCRETE SCATTERERS,
California Inst of Tech Pasadena Div of Engineering and Applied Science
David J. McCloskey. Aug 67, 39p Rept no. 85-41
Contract N00014-67-0094-0009

Descriptors: (*Sound signals, Scattering), (*Sound transmission, Scattering), Bubbles, Reflection, Boundary value problems, Liquids, Mathematical analysis.
Identifiers: Wave equation.

The problem of the transmission of sound from a plane sound source into a scattering half-space is studied; numerical results are presented for the average sound intensity and current. The reflection of an incident plane wave, inclined at an arbitrary angle to a scattering half-space is considered; an expression for the reflection coefficient, including both the coherent and incoherent reflection of sound, is obtained. The foregoing results are then applied to sound propagation in a liquid containing a large number of small gas bubbles. (Author)
AD-657 209 HC$3.00 MF$0.65

MEMORIA DE PRIMERAS JORNADAS LATINO AMERICANAE DE ACUSTICA (Proceedings of the First Latin American Symposium on Acoustics, Cordoba (Argentina), 17-23 May 1965),
Universidad Nacional de Cordoba (Argentina)
G. L. Fuchs. Aug 67, 346p
AFOSR-67-1954
Grant AF-AFOSR-916-65
Text in Spanish; individual papers have English summaries.

Descriptors: (*Acoustics, Symposia), Scientific research, Education, Buildings, Psychophysiology, Psychophysics, Acoustic equipment, Music, Noise, Speech, Sound, Ultrasonic radiation, Propagation, Vibration, Argentina.

The 'Memoria' (Proceedings) includes 46 papers, presented in the week-long working sessions of the First Latin American Meeting on Acoustics, covering the following fields of Acoustics: Research and Teaching, Architectural Acoustics, Physiological Acoustics, Psychoacoustics, Acoustical Instrumentation, Musical Acoustics, Noise and its control, Communications and Speech, Ultrasonics, Sonic Radiation and Propagation, Vibrations.
AD-657 324 HC$3.00 MF$0.65

LINEAR VERSUS LOGARITHMIC AVERAGING.
Final rept.,
Naval Ship Research and Development Center Washington D C Acoustics and Vibration Lab
Henry Cox. Jun 67, 10p
NSRDC-2419
Availability: Published in The Journal of Acoustical Society of America v39 n4 p688-90 Apr 1966.

Descriptors: (*Acoustics, *Numerical methods and procedures), Data processing systems, Theorems, Mathematical analysis, Sampling.

Consider n data samples (x1,...,xn) such that 0 < L = or < xi = or < U < infinity. Let K = U/L; then it is shown that independent of n a lower bound on the ratio of the geometric mean to the arithmetic mean of the data samples is given by (ln K/(K -1))K to the power ((1/ln K) - 1/ (K-1)). This bound is useful in acoustic signal processing since it limits the amount of deviation that can be attributed to averaging logarithms vice taking the logarithm of the average of data samples. Both methods are currently in use at facilities specializing in the processing of acoustic data. For a K of 10 dB, for example, the geometric mean is less than 1.5 dB below the arithmetic mean.
AD-657 404 Not available from CFSTI.

INFLECTION OF REPEATED MESSAGES.
Kenyon Coll Gambier Ohio
John W. Black. 1949, 4p
SPECDEVCEN-411-1-12
Contract N7onr-411 (12)
Availability: Published in Speech Monographs Research Annual v6 n2 p3-5 1949.

Descriptors: (*Sound pitch, Performance (Human)), Performance tests, Acoustics, Sound,

In repeating short messages, the tendency among speakers was to copy the direction of the final inflection of the phrase that was heard. This occurred differentially among messages. In more than half the instances tested the trend was significant at the five per cent level of confidence. The clinician or teacher may well dictate by example the inflections of spoken phrases when he uses techniques of repetition with students. This may occur when the student's set or expectancy is directed toward non-pitch characteristics of speech. (Author)
AD-657 422 Not available from CFSTI.

SWIMBLADDER MORPHOLOGY OF SOME MESOPELAGIC FISHES IN RELATION TO SOUND SCATTERING.
Navy Electronics Lab San Diego Calif
For primary bibliographic entry see Field 6C.
AD-657 443 HC$3.00 MF$0.65

PURDUE SPEECH SOUND TIMER.
Purdue Univ Lafayette Ind
For primary bibliographic entry see Field 17B.
AD-657 468 HC$3.00 MF$0.6

PITCH CHARACTERISTICS OF SHORT TONES. II. PITCH AS A FUNCTION OF TONAL DURATION,
Johns Hopkins Univ Baltimore Md
For primary bibliographic entry see Field 5J.
AD-657 521 Not available from CFSTI.

THE LOUDNESS OF REPEATED SHORT TONES,
Johns Hopkins Univ Baltimore Md Psychological Lab
W. R. Garner. 10 Feb 48, 15p
SPECDEVCEN-166-I-43
Contract N5ori-166 (01)
Availability: Published in The Journal of the Acoustical Society of America v20 n4 p513-27 Jul 1948.

Descriptors: (*Auditory signals, *Auditory perception), Frequency, Intensity, Time, Measurement, Attenuation, Calibration, Modulation, Tables.

The relation between loudness and the repetition rate of short tones was experimentally determined. The effects of intensity, frequency, and tone duration on this relation were also studied. The results can be summarized as follows: A series of repeated short tones can be louder than a steady tone of the same peak intensity. The difference between the loudness of repeated tones and a steady tone of the same intensity is dependent on both frequency and intensity. Two series of repeated tones, of the same frequency and intensity, will not have the same loudness unless their repetition rates and durations are the same. At high intensities, the tones with the faster repetition rate and shorter duration are louder, and conversely at low intensities. The rate at which loudness increases with repetition rate is dependent on the duration. The shorter the duration, the greater the change in loudness with a change in repetition rate; and conversely, the slower the repetition rate, the greater the change in loudness with a change in duration. All of the relations shown are understandable in terms of the shape of the loudness function, and of Fletcher and Munson for calculating the loudness of multicomponent tones, agree very well with the observed loudness levels. (Author)
AD-657 527 Not available from CFSTI.

SOME EFFECTS OF INTERAURAL PHASE DIFFERENCES ON THE PERCEPTION OF PURE TONES,
Johns Hopkins Univ Baltimore Md Psychological Lab
W. R. Garner, and M. Wertheimer. 1 Jul 51, 4p
SPECDEVCEN-166-1-131
Contract N5ori-166 (01)
Availability: Published in The Journal of the Acoustical Society of America v23 n6 p664-7 Nov 1951.

Descriptors: (*Sensory perception, *Sound), Performance (Human), Performance tests, Acoustics, Sound pitch, Pitch discrimination.
Identifiers: Tone perception.

Fifty-four naive observers were asked to report whether they could hear a difference between two successive tones which differed only in respect to which ear was leading in phase angle. They were not given specific suggestions to listen for a particular effect, but were later asked what they had heard. Two intensities, eight frequencies, and seven phase leads were used. The major conclusions from the results are: (1) All observers heard differences due to phase and identified the differences as localization, although for most the localization was in terms of which ear was stimulated rather than in terms of apparent localization of a sound source. (2) Pitch and loudness differences also occurred, but cannot be explained on the assumption that only one ear was effectively stimulated. (3) Measures of phase-difference thresholds, upper frequency limits, and time-difference thres-

holds show approximately the same results as are obtained with other methods. (Author)
AD-657 528 Not available from CFSTI.

IN THE PREDICTION OF THE NEAR FIELD NOISE OF SUPERSONIC JETS.
Wyle Labs., Inc., Huntsville, Ala.
J. B. Ollerhead. Aug 67, 110p NASA-CR-857, WR-67-6
Contract NAS8-21060

Descriptors: *Jet flow, *Prediction theory, *Rocket engine noise, *Subsonic aircraft, *Supersonic aircraft, Acoustic, Aircraft, Engine, Equation, Exhaust, Field, Flow, Jet, Near, Noise, Prediction, Radiation, Rocket, Shear, Shock, Subsonic, Supersonic, Theory, Turbulence, Wave.

For abstract, see STAR 05 19.
N67-33460 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

20B. Crystallography

SURVEY OF POSSIBLE LAYER STACKING STRUCTURES.
Revised ed.,
Illinois Univ Urbana
Paul A. Beck. 16 Oct 64, 17p
AROD-5103:6
Grant DA-ARO (D)-31-124-G842
Revision of manuscript submitted 19 Apr 64.
Availability: Published in Zeitschrift fuer Kristallographic v124 n1/2 p101-14 1967.

Descriptors: (*Crystal structure, Algebraic geometry), Symmetry (Crystallography), Sequences, Single crystals, Mathematical analysis, Periodic variations.
Identifiers: Cubic crystals, Hexagonal crystals.

The stacking of layers forming three-dimensional periodic structures is explored in the general case, where neither the layers nor the stacking need to be close-packed, and the connectivity number for the system may be either two or four. Procedures are described whereby all possible stacking variants can be systematically derived for a given number of layers, and for a given number of possible stacking positions. The latter depends on the structure of the layer and on the stacking vector. (Author)
AD-656 803 Not available from CFSTI.

GROWTH OF SINGLE CRYSTAL CALCIUM ORTHOVANADATE,
Defence Research Telecommunications Establishment Ottawa (Ontario)
C. D. Cox, and T. Surek. 1967, 4p
Availability: Published in Journal of the Canadian Ceramic Society, v35 1966.

Descriptors: (*Vanadates, *Crystal growth), (*Lasers, Materials), Calcium compounds, Vanadium compounds, Oxides, Phase studies, Fluorescence, Doping, Neodymium, Canada.
Identifiers: Calcium vanadates.

A Czochralski crystal-grower was used to obtain oriented single crystals of calcium orthovanadate, Ca3 (VO4)2. Techniques of growth of pure and neodymium-doped crystals are discussed, and some preliminary fluorescence results are reported. (Author)
AD-656 811 Not available from CFSTI.

PROCEEDINGS OF THE SYMPOSIUM ON THE STRUCTURE OF SURFACES, ARMY RESEARCH OFFICE, DURHAM, NORTH CAROLINA, 8-9 NOVEMBER 1966,
Army Research Office Durham N C
H. M. Davis, and K. R. Lawless. 1967, 271p
Prepared in cooperation with University of Virginia, Charlottesville.
Availability: Published in Surface Science, v8 p1-265 1967.

Descriptors: (*Surfaces, Symposia), (*Electron diffraction analysis, Surfaces), Crystal structure, Metals, Electron bombardment, Radiation damage, Antimony, Bismuth, Gold, Chemisorption, Tungsten, Oxidation, Copper, Nickel, Aluminum, Crystal lattices, Plasma medium, Inelastic scattering.
Identifiers: Field ion microscopy, Surface chemistry.

Contents: Surface asymmetry mechanism for fractional order peaks observed in LEED beams from metals; Self-consistent multiple-scattering approach to the interpretation of low-energy electron diffraction; Investigation of surface bombardment damage by LEED; Low-energy electron diffraction study of surfaces of antimony and bismuth; On the anomalous surface structures of gold; Note to the paper by D. G. Fedak and N. A. Gjostein, On the anomalous surface structures of gold; Characterization of chemisorption by LEED; Oxidation of the (112) face of tungsten; LEED and HEED studies of the interaction of oxygen with single crystal surfaces of copper; Chemisorption of oxygen and hydrogen on nickel films--reconstitution of the adsorbate--adsorbent interface; The effect of oxide films on dislocation--surface interactions in aluminum; Helium field-ion microscopy of hexagonal close-packed metals; Quantitative reflection electron diffraction in an ultra high vacuum camera; Low-energy electron diffraction with spherical shaped copper crystals; Surface structures on spherical copper crystals after adsorption of oxygen; Surface plasma oscillations as a tool for surface examinations; Inelastic scattering of low energy electrons from surfaces.
AD-656 874 Not available from CFSTI.

A CALCULATION OF THE COHESIVE ENERGY AND ELASTIC CONSTANTS OF MgO,
Uppsala Univ (Sweden) Inst of Physics
For primary bibliographic entry see Field 20K.
AD-656 981 Not available from CFSTI.

ELASTIC CONSTANTS OF AgCl,
Uppsala Univ (Sweden) Inst of Physics
J. Vallin. 21 Apr 67, 7p
AFOSR-67-1834
Contract AF 61 (052)-937
Availability: Published in Arkiv foer Fysik v34 n30 p367-9 1967.

Descriptors: (*Silver compounds, *Elasticity), (*Crystal lattices, Silver compounds), Chlorides, Single crystals, Ultrasonic radiation, Molecular association, Transition temperature, Specific heat, Sweden.
Identifiers: Cohesion, Debey temperature, Silver chloride.

Measurement was made of the elastic constants and the lattice distance of silver chloride from liquid helium to room temperature. The values of the elastic constants extrapolated to 0K are C11 = 7.391, C12 = 3.907, and C44 = 0.6935 in units of (10 to the 10th power)N/sqm. The lattice distance extrapolated to 0K is found to be 5.5098A. The Debye temperature and the cohesive energy calculated from the elastic constants are 127.1K and - 8.57 eV/ion pair respectively. (Author)
AD-656 983 Not available from CFSTI.

MAGNETIC AND STRUCTURAL STUDY OF THE SPINEL MnYb2S4.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20L.
AD-657 032 HC$3.00 MF$0.65

RESEARCH IN PURIFICATION AND SINGLE GROWTH OF II-VI COMPOUNDS.
Eagle-Picher Industries Inc Miami Okla Miami Research Labs
For primary bibliographic entry see Field 20L.
AD-657 045 HC$3.00 MF$0.65

CRYSTAL GROWTH STUDIES OF THE ALKALI METALS, THE RARE EARTHS, AND COBALT.
Final technical rept.,
Virginia Inst for Scientific Research Richmond
James F. Kirn. 1 Aug 67, 103p
AFOSR-67-1892
Grant AF-AFOSR-294-63

Descriptors: (*Crystal growth, *Metallic crystals), (*Alkali metals, Crystal growth), (*Rare earth elements, Crystal growth), (*Cobalt, Crystal growth), Lithium, Sodium, Potassium, Rubidium, Handling, Etching, Processing, Epitaxial growth, Symmetry (Crystallography), Furnaces, Gadolinium, Dysprosium, Holmium, Erbium, Annealing.

Contents: The growth, handling, and orienting of single crystals of lithium, sodium, potassium, and rubidium; The growth of single crystals of cobalt by the Czochralski technique; Attempts to grow single crystals of cobalt by a hydrothermal technique; Efforts to grow single crystals of the rare earths using an arc image furnace; The growth of large gadolinium crystals by a temperature-gradient method.
AD-657 053 HC$3.00 MF$0.65

EXPERIMENTAL AND THEORETICAL DETERMINATION OF THE ELASTIC CONSTANTS OF SODIUM CHLORIDE,
Uppsala Univ (Sweden) Inst of Physics
G. Pettersson, J. Vallin, J. L. Calais, and K. Mansikka. 21 Apr 67, 10p
AFOSR-67-1833
Contract AF 61 (052)-937
Availability: Published in Arkiv fuer Fysik v34 n31 p371-6 Apr 12 1967.

Descriptors: (*Sodium chloride, *Elasticity), (*Crystal lattices, Sodium chloride), Single crystals, X-ray diffraction analysis, Ultrasonic radiation, Molecular association, Molecular orbitals, Sweden.
Identifiers: Cohesion.

The elastic constants and the lattice distance of NaCl were determined both experimentally and theoretically. The experimental set up includes an X-ray rotation camera and an ultra sonic double-pulse echo apparatus. The theoretical calculations are based on Lowdin's method. Not only nearest neighbor interaction is considered but also next nearest negative neighbor interaction. It is found that the two contributions are of the same order of magnitude. (Author)
AD-657 060 Not available from CFSTI.

ADSORPTION ON NIOBIUM (110), TANTALUM (110), AND VANADIUM (110) SURFACES,

Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7D.
AD-657 064 Not available from CFSTI.

MATERIALS PREPARATION AND CHARACTERIZATION RESEARCH.
Pennsylvania State Univ University Park Materials Research Lab
For primary bibliographic entry see Field 20L.
AD-657 237 HC$3.00 MF$0.65

LOW MAGNETIC SATURATION GARNETS.
Sperry Microwave Electronics Co Clearwater Fla
For primary bibliographic entry see Field 20C.
AD-657 240 HC$3.00 MF$0.65

CALIBRATION AND USE OF AN ELECTRON MICROSCOPE FOR PRECISION MICROMEASUREMENTS IN THIN FILM MATERIALS,
Pennsylvania State Univ University Park Materials Research Lab
For primary bibliographic entry see Field 20L.
AD-657 243 Not available from CFSTI.

ONE-DIMENSIONAL ATOMIC MODEL FOR A DISLOCATION LINE,
Columbia Univ New York Dept of Mechanical Engineering
W. T. Sanders. 22 Aug 66, 9p
AFOSR-67-1905
Contract AFOSR-228-63, Grant AF-AFOSR-1098-66
Availability: Published in The Physical Review v154 n3 p654-61 Feb 15 1967.

Descriptors: (*Dislocations, Mathematical models), Approximation (Mathematics), Shear stresses, Crystal lattice defects, Dynamics, Solids.

In a previous paper the author used a two-dimensional lattice model to examine the equilibrium properties of a dislocation kink. The width, energy, and Peierls stress of the kink were computed for a range of values of the shear stress of a perfect lattice. In the present work a one-dimensional approximation to this two-dimensional model is developed, through the use of single-chain localized modes, and the same properties computed. This approximation is shown to be equivalent to a 'discrete string' model of the dislocation line, in which the string tension and Peierls potential appear naturally, and with which the kink Peierls stress can be determined. All the equilibrium properties are in excellent agreement with the properties of the two-dimensional model, and the computation time is about 1/3000 as long. It appears that the same one-dimensional model could be used for more extensive investigations of dislocation behavior, including dynamic effects. (Author)
AD-657 244 Not available from CFSTI.

THE COVALENT BOND IN CRYSTALS. I. ELEMENTS OF A STRUCTURAL THEORY,
Chicago Univ Ill
J. C. Phillips. 1967, 34p
Contract Nonr-2121 (22)

Descriptors: (*Crystals, *Chemical bonds), (*Semiconductors, Chemical bonds), Crystal structure, Theory, Valence, Dielectric properties, Ground state, Plasma medium, Electrons, Elasticity.

An a posteriori theory is developed for the structural energy of covalent crystals. The microscopic theory is based on ionic pseudopotentials and valence dielectric screening. The theory explains the difference between empirical pseudopotential form factors derived from the optical spectra of semiconductors and the metallic form factors calculated from free ion term values by Animalu and Heine. A by-product of the theory, which utilizes Penn's model isotropic semiconductor dielectric function, is a relation between the covalent bonding charge and the macroscopic dielectric constant. The extension of the theory to III-V and II-VI semiconductors is described briefly. The theory may be used to calculate elastic and macroscopic dielectric properties of covalent crystals starting only from ionic pseudopotential form factors. (Author)
AD-657 432 HC$3.00 MF$0.65

THE COVALENT BOND IN CRYSTALS. II. PARTIALLY IONIC BINDING,
Chicago Univ Ill
J. C. Phillips. 1967, 38p
Contract Nonr-2121 (22)
See also AD-647 432.

Descriptors: (*Crystals, *Chemical bonds), (*Semiconductors, Chemical bonds), Crystal structure, Theory, Band theory of solids, Gallium arsenides, Zinc compounds, Selenides, Polarization, Crystal lattices, Electrostatics.
Identifiers: Zinc selenide.

The general theory of covalent bonding developed in AD-657 432 is extended to heteropolar crystals. In diatomic crystals the theory depends on two parameters, an energy gap for each atom, or an energy gap for the medium and a polarizability parameter eta. The latter can be determined by comparison with empirical pseudopotential form factors; the value obtained for GaAs and ZnSe which brings the form factors of the latter into agreement with the ion core form factors of Animalu and Heine, is eta = -0.05 + 0.05 or - 0.05. This polarizability parameter can be used to estimate the effective charge ec* defined by Callen, which describes the splitting of longitudinal and transverse optic modes of vibration at q = 0. The result in GaAs is ec*/e = 0.14 + 0.04 or - 0.04, in rough agreement with the experimental value of 0.20 + 0.03 or - 0.03. The experimental values for ec* may be used to estimate the gap parameters for each atom when complete data are available. (Author)
AD-657 433 HC$3.00 MF$0.65

THE COVALENT BOND IN CRYSTALS. III. ANISOTROPY AND QUADRUPOLE MOMENTS,
Chicago Univ Ill
J. C. Phillips. 1967, 17p
Contract Nonr-2121 (22)
See also AD-657 433.

Descriptors: (*Crystals, *Chemical bonds), (*Graphite, Chemical bonds), Crystal structure, Theory, Anisotropy, Quadrupole moments, Electrostatics, Tensor analysis, Molecular energy levels.

The form factors of covalent atoms in anisotropic environments are discussed. As an example of the general theory the bonding charge in graphite is calculated. Comparison of the planar bonding charge with the tetrahedral one leads to evaluation of the bonding charge in double and triple carbon-carbon molecular bonds. (Author)
AD-657 434 HC$3.00 MF$0.65

THE COVALENT BOND IN CRYSTALS. IV. LATTICE DEFORMATION ENERGIES,
Chicago Univ Ill
J. C. Phillips. 1967, 21p
Contract Nonr-2121 (22)
See also AD-657 436.

Descriptors: (*Crystals, *Chemical bonds), Crystal structure, Theory, Crystal lattices, Deformation, Diamonds, Interactions, Atomic orbitals, Neutron diffraction analysis, Metals, Electrons, Phonons.

A general method is described for calculating lattice deformation energies in covalent structures. The formulae are presented explicitly for harmonic energies in diamond-type crystals. The theory differs intrinsically from linear screening theories because of the inclusion of bond stretching terms. These are calculated using a dynamical covalent sum rule. The results show that bond stretching leads to large bond-bond interaction energies that are similar to those in a nearest neighbor classical shell model. The theory can be used to infer the covalent screening function from lattice vibration spectra measured by inelastic neutron scattering. (Author)
AD-657 435 HC$3.00 MF$0.65

THE PHASE AB2 IN THE TERNARY SYSTEMS La-Sb-Te AND La-Sn-Sb,
Texas Univ Austin Dept of Chemical Engineering
R. Wang, H. Steinfink, and A. Raman. 16 Jan 67, 4p
AFOSR-67-1917
Grant AF-AFOSR-806-65
Availability: Published in Inorganic Chemistry v6 p1298-1300 1967.

Descriptors: (*Lanthanum, Phase studies), (*Antimony alloys, Phase studies), (*Tellurium alloys, Phase studies), (*Tin alloys, Phase studies), X-ray diffraction analysis, Crystal lattices, Deformation, Solid solutions.

Ternary alloys of the sections LaSb2-LaTe2 and 'LaSn2'-LaSb2 were investigated by X-ray diffraction techniques. The substitution of Te by Sb in the first system produces an orthorhombic distortion of the tetragonal LaTe2 structure. The maximum solubility of Sb in LaTe2 leads to the terminal composition LaSb1.5Te0.5. In the 'LaSn2'-LaSb2 section no alloy of the type LaSn2-xSbx for 0 < or = x < 2 exists. A phase LaSnSb2 was found and it is isostructural with NdTe3. (Author)
AD-657 471 Not available from CFSTI.

D MATRIX A COMPUTER PROGRAM FOR CALCULATING VALENCE FORCE COORDINATES IN TERMS OF ATOM DISPLACEMENTS OF A MOLECULE OR CRYSTAL,
Idaho Nuclear Corp., Idaho Falls.
J. K. Boyter, and H. L. McMurry. May 67, 46p
Contract AT (10-1)-1230

Descriptors: (*Computer programs, Crystals), (*Crystallography, *Programming languages).

For abstract, see NSA 21 16.
IN-1076 HC$3.00 MF$0.65

CONTRIBUTION TO THE STUDY OF SCREW DISLOCATIONS.
Contribution A L Etude des Dislocations Helicodales
Commissariat A L Energie Atomique, Fontenay-Aux-roses (France). Centre D'etudes Nucleaires.
J. Grilhe. 1966, 65p CEA-R-2916
in French, English Summary

Descriptors: *Helical winding, *Mathematical model, *Screw dislocation, *Spiral, Calculation, Crystal, Dislocation, Equilibrium, Germination, Growth, Helix, Lattice, Mathematics, Model, Property, Screw, Stress, Winding.

For abstract, see STAR 05 19.
N67-33161 HC$3.00 MF$0.65

DIFFUSION ALONG AND AROUND DISLOCATIONS.
Diffusion le Long Et Autour des Dislocations
Commissariat A L Energie Atomique, Saclay (France). Centre D'etudes Nucleaires.
G. Brebec. Oct 65, 18p CEA-R-2831
in French, English Summary

Descriptors: *Crystal dislocation, *Diffusion effect, *Grain boundary, Approximation, Boundary, Crystal, Diffusion, Dislocation, Effect, Ficks equation, Grain, Mathematics, Problem, Solution.

For abstract, see STAR 05 19.
N67-33285 HC$3.00 MF$0.65

NUCLEAR CHEMISTRY DIVISION ANNUAL REPORT, 1966,
California Univ., Berkeley. Lawrence Radiation Lab.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 21 16.
UCRL-17299 HC$3.00 MF$0.65

20C. Electricity and Magnetism

PHOTOELECTRONIC PROCESSES IN ZnS SINGLE CRYSTALS.
Stanford Univ Calif Dept of Materials Science
For primary bibliographic entry see Field 20F.
AD-656 796 Not available from CFSTI.

GALVANOMAGNETIC PROPERTIES OF SINGLE-CRYSTAL IRON FILMS AND WHISKERS,
Virginia Univ Charlottesville Dept of Physics
J. E. Christopher, Acar Isin, and R. V. Coleman. 1967, 7p
AROD-3084:8-P
Grant DA-ARO (D)-31-124-G522
Availability: Published in Journal of Applied Physics v38 n3 p1322-4 Mar 1 1967.

Descriptors: (*Resistance (Electrical), Magnetic fields), (*Iron, Resistance (Electrical)), (*Metal films, Iron), (*Whiskers (Crystals), Iron), Cryogenics, Single crystals, Hall effect, Electric currents.
Identifiers: Galvanomagnetic effect, Magnetoresistive effect.

Galvanomagnetic effects have been measured and compared in single-crystal iron films 0.1 to 5 microns in thickness and in iron whiskers 10 to 500 microns in thickness. Measurements have been made in a temperature range 1 degree to 300 degrees K and in magnetic fields to 80 kOe, although in this paper we discuss primarily the low-field negative magnetoresistance observed at helium temperatures. The negative magnetoresistance develops when the mean free path of the electron becomes long. In the case of whiskers with RRR nearly equal to 1000 the effect can represent a 90% reduction in resistance at 4.2 degrees K, while with films having RRR nearly equal to 10-50 the effect is reduced to 1%. The negative magnetoresistance in (100) axial whiskers is very sensitive to measuring current, while the negative magnetoresistance in (111) axial whiskers is not as sensitive, although both cases show substantial deviations from Ohm's law. Analysis of the longitudinal and transverse data on the films indicates that the reverse galvanomagnetic effect is making a substantial contribution. Hall-effect measurements have also been made but do not show any anomalous behavior in low fields. (Author)
AD-656 807 Not available from CFSTI.

PHYSICAL FIELDS IN SPACE-TIME,
Politecnico Di Milano (Italy) Istituto Di Matematica
For primary bibliographic entry see Field 20J.
AD-656 852 Not available from CFSTI.

APOLLO TELEMETRY FRAME SYNCHRONIZATION TECHNIQUES.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 9F.
AD-656 890 HC$3.00 MF$0.65

LOW TEMPERATURE MAGNETIC PHASE TRANSITIONS IN CoCl2.6H2O AND MnBr2.4H2O.
Technical rept.,
Carnegie Inst of Tech Pittsburgh Pa Dept of Physics
V. A. Schmidt, and S. A. Friedberg. 18 Jul 67, 29p Rept no. TR-6
Contract Nonr-760 (26)
Doctoral thesis.
Availability: Published in Unidentified journal.

Descriptors: (*Cobalt compounds, Magnetic properties), (*Manganese compounds, Magnetic properties), (*Antiferromagnetism, Transition temperature), Chlorides, Bromides, Cryogenics, Phase studies, Nuclear spins, Magnetic resonance, Recording systems, Magnetometers.
Identifiers: Cobaltous chloride, Manganous bromide, Neel temperature.

Apparatus for the continuous recording of quasi-static magnetization isotherms at low temperatures was developed. It was employed in the study of phase transitions in two antiferromagnets induced by magnetic fields up to 16 kOe applied along the preferred directions of spin alignment. Antiferro-paramagnetic transitions was detected in CoCl2.6H2O between the zero-field Neel point, TN (O) = 2.29K, and 2.06K. Below 2.06K, 'spin-flopping' is observed. The resulting magnetic H-T phase diagram agrees well with that obtained by resonance techniques. Measurements on MnBr2.4H2O below TN (O) = 2.13K show only antiferro-paramagnetic transitions down to 1.15K with no indication of spin-flopping. The observed antiferro-paramagnetic transitions appear to be of the lambda-type while the spin-flop transitions in CoCl2.6H2O are probably of first order. (Author)
AD-656 924 Not available from CFSTI.

THEORY OF ELECTROMAGNETIC PROPERTIES OF SUPERCONDUCTING AND NORMAL SYSTEMS. I,
Illinois Univ Urbana Dept of Physics
Sang Boo Nam. 28 Oct 66, 20p
AROD-431:84-P
Contract DA-31-124-ARO (D)-114
Availability: Published in Physical Review v156 n2 p470-86 Apr 1967.

Descriptors: (*Superconductors, Electromagnetic properties), Electric currents, Tunneling (Electronics), Magnetic properties, Green's function, Wave functions, Quantum mechanics.

General expressions for the current density for superconductors in a transverse electromagnetic field are derived from a Green's-function formulation. They are sufficiently general to apply to cases of strong coupling, to superconductors with magnetic impurities, and to anisotropic materials. It is explicitly shown that the response function satisfies (lim as q approaches 0, lim as omega approaches 0, K (q, omega)) = K (0,0) = (lim as omega approaches 0, lim as q approaches 0, K (q, omega)). The condition for superconductivity is that K (0,0) be nonvanishing. An expression for the current density in real space in a form similar to that of Mattis and Bardeen is obtained. Various limiting forms of the expressions are derived to facilitate applications to various problems. An expression for the Josephson tunnelling current which can be applied to strong-coupling and impure superconductors is derived under the assumption that the tunnelling matrix element is constant. (Author)
AD-656 963 Not available from CFSTI.

FURTHER EVIDENCE OF NAGAOKA'S BOUND STATE FOR CONDUCTION ELECTRONS IN DILUTE ALLOYS,
National Research Council of Canada Ottawa (Ontario) Div of Applied Chemistry
C. M. Hurd. 20 Apr 67, 4p
NRC-9636
Availability: Published in Physical Review Letters v18 n25 p1127-9 Jun 19 1967.

Descriptors: (*Magnetic properties, Anomalies), Resistance (Electrical), Cryogenics, Magnetic moments, Iron alloys, Copper alloys.

The temperature dependence of the solute magnetic susceptibility of very dilute Cu-Fe alloys shows an anomaly at a temperature in the range 6-17K. The effective Bohr-magneton value of the localized moment is appreciably reduced below this temperature. It is suggested that this anomaly can be interpreted as further evidence of the formation of a quasibound election state as suggested by Nagaoka. (Author)
AD-656 978 Not available from CFSTI.

MAGNETIC AND STRUCTURAL STUDY OF THE SPINEL MnYb2S4.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20L.
AD-657 032 HC$3.00 MF$0.65

EVIDENCE FOR A SINGLET GROUND STATE IN THE MAGNETIC IMPURITY PROBLEM,
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
For primary bibliographic entry see Field 20L.
AD-657 051 Not available from CFSTI.

GROUND STATE OF THE KONDO MANY-BODY SCATTERING PROBLEM,
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
For primary bibliographic entry see Field 20L.
AD-657 052 Not available from CFSTI.

MAXWELL'S EQUATIONS AND DETERMINATE SYSTEMS,
Polytechnic Inst of Brooklyn Farmingdale N Y Dept of Electrophysics
Henry Berger. 1967, 3p
AFOSR-67-1798
Contract AF 49 (638)-1402
Availability: Published in American Journal of Physics v35 n3 p285-6 Mar 1967.

Descriptors: (*Partial differential equations, Electromagnetism), Electromagnetic waves, Antennas, Dielectrics.

Comments have appeared recently on the form of the constitutive relations appending to Maxwell's equations to form a determinate system of equations. The attached articles intention is to cite some well-known results which contradict the assertion of the general validity. (Author)
AD-657 062 Not available from CFSTI.

MOSSBAUER EVIDENCE FOR A SPIN-COMPENSATED STATE IN DILUTE Fe-Cu ALLOYS,
Massachusetts Inst of Tech Cambridge National Magnet Lab
For primary bibliographic entry see Field 20L.
AD-657 107 Not available from CFSTI.

LOW MAGNETIC SATURATION GARNETS.
Quarterly progress rept. no. 1, 1 Feb-30 Apr 67, Sperry Microwave Electronics Co Clearwater Fla
W. R. Wilson, L. R. Hodges, Jr., G. P. Rodrigue, and G. R. Harrison. Aug 67, 33p Rept no. SJ-200-4526-1
ECOM-0142-1
Contract DAAB07-67-C-0142

Descriptors: (*Microwave equipment, Materials), (*Vanadium compounds, Garnet), (*Garnet, Magnetic properties), Magnetic fields, Anisotropy, Hysteresis, Single crystals, Crystal growth, Magnetic materials, Transmission lines, Waveguide circulators.
Identifiers: Magnetic remanence, Magnetic saturation.

The anisotropy field measured on selected compounds of YCaVIG increased in a linear fashion with decreasing temperature. The room temperature anisotropy fields for YCaVIG materials are considerably higher than the BiCaVIG compounds for an equivalent 4 (pi)Ms (at 4 (pi)Ms of 530 gauss, 240 oersteds compared to 65 oersteds). Linewidth versus temperature measured for single crystals of YIG, BiCaVIG and BiCaV (Al)IG showed the linewidth to be independent of temperature from -60 to +60C. Remanence ratios (RR) of 0.55 with coercive fields of 3 oersteds were measured on single phase, high density Bi0.4Ca2.6V1.3Fe3.7O12. Materials containing a second phase of Fe2O3 showed a sharp drop in RR (0.55 to 0.38). The operation of a microstrip circulator using BiCaV (Al)IG material is described. (Author)
AD-657 240 HC$3.00 MF$0.65

NETWORK THEORY WITHOUT CIRCUIT ELEMENTS.
Revised ed.,
Polytechnic Inst of Brooklyn N Y Dept of Electrophysics
Herbert J. Carlin. 10 Feb 67, 19p
AROD-5683:1
Contract DA-31-124-ARO (D)-363
Revision of manuscript received 27 Sep 66.
Availability: Published in Proceedings of IEEE v55 n4 p482-97 Apr 1967.

Descriptors: (*Networks, Theorems), Linear systems, Response, Theory, Energy, Decomposition, Signals, Integral transforms.

Network methods are by no means limited to lumped systems. Once the ports of a generalized physical structure are defined by use of a modal decomposition of signals, the structure can be analyzed using network techniques which extend beyond the domain of RLC systems and rational network functions. If the physical system is observed as a black box at its ports and various physical time-domain postulates such as linearity, energy, and power conservation theorems are applied in network terms, a variety of realizability relations are obtained for linear, passive, time-invariant structures. For example, one is led to generalizations of bounded real and positive real functions for distributed systems. The network technique also results in a number of interesting theorems for lossless structures such as a generalization of Foster's reactance theorem, and restrictions on minimum phase realizability, and on signal transmission and group delay in distributed, lossless networks. These results apply in structures containing gyrotropic, dispersive media as well as in the reciprocal, nondispersive case. (Author)
AD-657 275 Not available from CFSTI.

THIN-FILM HALL-EFFECT MAGNETOMETER.
Final rept. Jan 63-Jul 64.
Naval Ordnance Lab Corona Calif
1 Oct 64, 44p
ARPA Order-414

Descriptors: (*Magnetometers, *Hall effect), (*Semiconducting films, Magnetometers), Indium antimonides, Wiring diagrams, Magnetic fields, Performance (Engineering), Sensitivity, Electrical networks.

The experimental and theoretical investigations were concerned with (1) the fabrication of semiconductor films for the detection of small magnetic fields by means of the Hall effect, (2) the investigation of magnetic flux concentrators to be used in conjunction with such Hall elements, and (3) the development of a hand-carried battery-operated magnetometer based on this effect. Of the four complete magnetometers that were constructed and tested in the laboratory, two were delivered to ARPA. These magnetometers may be used to detect and measure magnetic fields as small as 10 to the -5 power oe in spite of large magnetic field gradients and in spite of the large bias provided by the earth's magnetic field.
AD-657 336 HC$3.00 MF$0.65

LIGHT SCATTERING BY BANDED SPHERULITES.
Technical rept.,
Massachusetts Univ Amherst Polymer Research Inst
S. B. Clough, J. J. van Aartsen, and R. S. Stein.
May 67, 55p Rept no. TR-90
Contract Nonr-3357 (01)

Descriptors: (*Polymers, Optical properties), (*Crystal structure, Polymers), Light, Scattering, Polarization, Diffraction, Crystal lattices, Deformation.
Identifiers: Spherulites.

Previous studies (see AD-657 351) of light scattering from banded (or ringed) spherulites are extended to: (1) Two-dimensional spherulites having biaxial crystals with helicoidally varying orientation of their optic axes about the radius. Scattering patterns from such spherulites are calculated and prove to be more complex than corresponding patterns from spherulites containing uniaxial crystals. (2) The scattering from two-dimensional spherulites containing helicoidally oriented uniaxial crystals where the spherulite is affinely deformed. Calculated scattering patterns indicate that the HV scattering maxima resulting from this helicoidal orientation which is initially in the form of symmetrical arcs becomes deformed and displaced with spherulite deformation. (3) The case of banded spherulites with step variation of density or orientation of scattering material. This gives rise to higher order scattering maxima (as are experimentally observed) in contrast to the prediction of the existance of only first order maxima for spherulites with uniformly periodic variation in density or orientation. The predictions are compared with theoretical predictions and experimental results for the scattering from circular gratings. (Author)
AD-657 351 HC$3.00 MF$0.65

AN EXPERIMENTAL METHOD FOR THE STUDY OF INTERACTIONS BETWEEN DETONATION WAVES AND MAGNETIC FIELDS.
Technical note,
California Univ Berkeley Office of Research Services
Eric Arthur Lundstrom, P. A. Urtiew, and A. K. Oppenheim. Jun 67, 38p Rept no. TN-3-67, AS-67-7
AFOSR-67-1895
Grant AF-AFOSR-129-67

Descriptors: (*Magnetic fields, *Detonation waves), Pipes, Electric fields, Magnets, Calibration, Mechanical drawings, Design, Circuits.

Reported here is the design and construction of an experimental apparatus for the study of the influence of electromagnetic fields on the structure of detonation waves. The apparatus consists of a detonation tube having a 3/4 inch square test section with axial magnetic and transverse electric fields. The structure of the detonation wave is recorded by the use of the soot film technique. (Author)
AD-657 354 HC$3.00 MF$0.65

APPARATUS FOR MEASUREMENT OF TRANSPORT PROPERTIES OF PHOTOCARRIERS IN INSULATING CRYSTALS.
Technical rept.,
Illinois Univ Urbana Dept of Physics
J. A. Borders, and J. W. Hodby. Aug 67, 27p
AROD-4928:6-P
Contract DA-31-124-ARO (D)-217
Doctoral thesis.

Descriptors: (*Photoconductivity, *Measuring devices (Electrical + electronic)), (*Halides, *Transport properties), Hall effect, Theses, Electrical properties, Cyclotron resonance phenomena, Sensitivity, Accuracy.

In this paper the authors discuss apparatus suitable for detailed study of photoconductivity in wide band gap insulating crystals such as the alkali and silver halides. The sensitivity and accuracy of measurement possible with this apparatus exceeds that of previous designs by two orders of magnitude. The apparatus has been used for several months in a study of the transport properties of alkali, silver and thallium halides. New results have been obtained such as the observation of cyclotron resonance and of spin-polarized scattering. (Author)
AD-657 357 HC$3.00 MF$0.65

EQUILIBRIUM SPIN CONFIGURATION AND RESONANCE BEHAVIOR OF RbMnF3,
Massachusetts Inst of Tech Cambridge Microwave and Quantum Magnetics Group
P. H. Cole, and W. J. Ince. Jun 66, 33p Rept no. Scientific-1
AFCRL-67-0253
Contract AF 19 (628)-5876

Descriptors: (*Perovskites, *Antiferromagnetism), (*Rubidium compounds, Antiferromagnetism), (*Manganese compounds, Antiferromagnetism), Electrons, Spin, Crystal substructure, Magnetic resonance, Microwave spectroscopy, X band, Transformations, Equations.
Identifiers: Manganese rubidium fluoride.

The equilibrium orientations of the magnetic sublattices of the cubic antiferromagnet RbMnF3 were studied. By assuming spatially uniform magnetization and restricting the applied steady magnetic field to lie in a (110) plane, the problem is considerably simplified. The analysis enables the equilibrium spin configurations for the important cases of the magnetizing field applied along any of the three principal crystal axes to be predicted. Each case has more than one solution. The theory predicts that abrupt spin flopping from one equilibrium state to another should occur under certain conditions. An antiferromagnetic resonance theory is presented which is applicable over a wide range of field and embraces the low and high field resonance theories previously reported as restricted examples. Observations of the resonance spectrum at X-band frequencies for the applied field range 0 to 12 Koe are presented. The measurements provide excellent verification of the resonance theory and confirm the validity of the equilibrium analysis. The best fit between theory and experiment was obtained by assuming values of the anisotropy field significantly different from the previously published value. Abrupt spin flopping was not observed. The resonance data indicate that the magnetization can switch between equilibrium directions gradually over a range of field and at much lower field strengths than the theoretical flopping field. (Author)
AD-657 374 HC$3.00 MF$0.65

HARMONIC GENERATION IN ANTIFERROMAGNETIC RESONANCE,
Massachusetts Inst of Tech Cambridge Microwave and Quantum Magnetics Group
P. H. Cole. Jun 66, 30p Rept no. Scientific-2
AFCRL-67-0254
Contract AF 19 (628)-5876

Descriptors: (*Antiferromagnetism, Resonance), Harmonic generators, Equations of motion, Anisotropy, Torque, Oscillation, Mathematical analysis, Stability.
Identifiers: Spin waves.

An energy method is used to obtain linear and nonlinear terms of the equation of motion of an antiferromagnetic spin system. It is shown that energy

conversion between resonance modes, an octave apart in RbMnF3 should be possible. The threshold power level for efficient energy conversion is calculated and compared with that for the excitation of synchronous spin waves. (Author)
AD-657 375 HC$3.00 MF$0.65

THE ANTIFERROMAGNETIC TRANSITION IN CoCl2.6H2O AND FISHER'S RELATION.
Technical rept.,
Carnegie Inst of Tech Pittsburgh Pa Dept of Physics
J. Skalyo, Jr., A. F. Cohen, S. A. Friedberg, and R. B. Griffiths. 19 Jun 67, 20p Rept no. TR-5
Contract Nonr-760 (26)
Availability: Published in Unidentified Journal nd.

Descriptors: (*Cobalt compounds, Antiferromagnetism), (*Antiferromagnetism, Phase diagrams), Chlorides, Hydrates, Specific heat, Magnetic properties, Transition temperature, Partial differential equations, Thermodynamics.
Identifiers: Cobaltous chloride, Heat capacity, Magnetic susceptability, Neel temperature.

It was found that the zero-field heat capacity Cp and parallel susceptibility, chi-parallel, of the antiferromagnet CoCl2.6H2O obey Fisher's relation, C = A (the partial differential derivative of chi (T) with respect to T), through the Neel point TN (O). The coefficient A is shown by a thermodynamic argument to yield the curvature of the antiferro-paramagnetic phase boundary in the H-T plane for H=O. A parabola having the curvature deduced in this way is found to fit the observed phase boundary over a wide range of H and T. (Author)
AD-657 398 Not available from CFSTI.

TRANSPORT PROPERTIES OF THE 'EXCITONIC INSULATOR'. I. ELECTRICAL CONDUCTIVITY.
California Univ San Diego La Jolla Dept of Physics
For primary bibliographic entry see Field 20L.
AD-657 439 HC$3.00 MF$0.65

TRANSPORT PROPERTIES OF THE 'EXCITONIC INSULATOR'. II. THERMAL CONDUCTIVITY.
California Univ San Diego La Jolla Dept of Physics
For primary bibliographic entry see Field 20L.
AD-657 440 HC$3.00 MF$0.65

SUBLATTICE MAGNETIZATION IN YTTRIUM AND LUTETIUM IRON GARNETS,
Duke Univ Durham N C Dept of Physics
Roland Gonano, Earle Hunt, and Horst Meyer.
27 Oct 66, 13p
Availability: Published in The Physical Review v156 n2 p521-33 Apr 10 1967.

Descriptors: (*Garnet, Magnetic properties), Yttrium compounds, Lutecium compounds, Crystal lattices, Nuclear magnetic resonance, Hyperfine structure.
Identifiers: Spin waves.

The temperature dependence of the a and d sublattice magnetization in yttrium iron garnet (YIG) and lutetium iron garnet (LuIG) was observed by means of the NMR of Fe57 between 4 and 373K, with special emphasis on the temperature range where the spin-wave theory is expected to hold. An analysis of these results in terms of the spin reversals due to acoustical and optical spin-wave modes was carried out. From a comparison of theory and experiment in YIG, the value of the dispersion parameter D = 30.0 plus or minus 0.6/cm is obtained. A reasonable estimate of the separate exchange parameters is Jad = 22.5 plus or minus 1/cm, Jdd = 2.0 plus or minus 0.5/cm, and Jaa = 0.5 plus or minus 0.5/cm, subject to the constraint that their linear combination gives D = 30/cm. The agreement between experiment and theory is improved when a small transferred hyperfine interaction from the d sites to the a sites (and vice versa) is postulated. For LuIG one obtaines a value D = 27.3/cm. The values of D and of the exchange parameters Jij for YIG and LuIG are compared with those from other experiments. In YIG, the magnetic field dependence of the sublattice magnetizations was observed up to 10 kG at 63 and 77K, and there is good agreement with the results from spin-wave theory. It is believed that this is the first such investigation in a ferrimagnet. In the course of these experiments, the gyromagnetic ratio of Fe57 was determined to be 137.4 plus or minus 0.2 Hz/G. In LuIG a broad spectrum of resonances between about 40 and 76 MHz was observed at 4.2K. (Author)
AD-657 486 Not available from CFSTI.

MAGNETIC-FIELD-INDUCED SURFACE STATES IN A PURE TYPE-I SUPERCONDUCTOR,
California Univ Los Angeles Dept of Physics
P. Pincus. 16 Jan 67, 8p
Contract Nonr-233 (88)
Availability: Published in Physical Review v158 n2 p346-53 Jun 10 1967.

Descriptors: (*Superconductors, *Magnetic fields), Excitation, Geometry, Energy, Particles, Momentum, Electromagnetic waves, Absorption, Electric fields, Kinetic energy, Integrals, Thermal properties.

We consider the problem of a bulk pure type-I superconductor in a static magnetic field (H less than Hc) applied parallel to the surface. We show that there may exist single-particle excitations of energy (relative to the Fermi energy) less than the zero-field energy gap, which are spatially bound to the surface region where the screening current flows. We then investigate the contribution of these localized states to the electromagnetic absorption of the superconductor at frequencies below the zero-field absorption edge (2 delta). Order-of-magnitude estimates seem to be in agreement with the observations in aluminum by Budzinski and Garfunkel. (Author)
AD-657 504 Not available from CFSTI.

CONDUCTIVITY PHENOMENA IN POLYCRYSTALLINE ZINC OXIDE FILMS.
Brown Engineering Co., Inc., Huntsville, Ala. Research Labs.
For primary bibliographic entry see Field 20L.
For abstract, see STAR 05 19.
N67-32746 HC$3.00 MF$0.65

SELF-CONSISTENT TREATMENT OF INTERACTING SPIN WAVES AT FINITE TEMPERATURES.
Etude A Temperature Finie D'un Systeme D'ondes de Spin en Interaction Dans Une Approximation Self-consistante
Commissariat A L Energie Atomique, Saclay (France). Centre D'etudes Nucleaires.
M. Bloch. 1966, 78p CEA-R-2821
in French, English Summary

Descriptors: *Ferromagnetism, *Spin wave, *Wave interaction, Calculation, Energy, Ferrimagnetism, Finite, Interaction, Magnetization, Property, Self-consistent, Spin, Temperature, Treatment, Wave.

For abstract, see STAR 05 19.
N67-33231 HC$3.00 MF$0.65

20D. Fluid Mechanics

LIMITS ON MINIMUM-SPEED V/STOL WIND-TUNNEL TESTS.
Washington Univ Seattle
For primary bibliographic entry see Field 14B.
AD-656 810 Not available from CFSTI.

THE DESIGN AND TESTING OF AN ALL-LENS SCHLIEREN SYSTEM.
Texas Univ Austin Defense Research Lab
For primary bibliographic entry see Field 14E.
AD-656 886 HC$3.00 MF$0.65

THE FORCES ON TWO SPHERES IN STOKES FLOW,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 4B.
AD-657 008 HC$3.00 MF$0.65

A STUDY OF THE CHARACTERISTICS OF TRANSONIC BUFFET PRESSURES ON A LARGE HAMMERHEAD CONFIGURATION,
Aerospace Corp El Segundo Calif Technical Operations
H. E. Wang. Jun 67, 89p Rept no. TR-1001 (2116-40)-1
ESD-TR-67-130
Contract AF 04 (695)-1001

Descriptors: (*Aerodynamic configurations, *Transonic characteristics), (*Buffeting, Pressure), (*Launch vehicles (Aerospace), Transonic characteristics), Mathematical prediction, Analysis of variance, Turbulence, Wake, Flow separation.

The transonic fluctuating pressures over a large hammerhead configuration are investigated. The study examines existing experimental data on other configurations, presents fluid-mechanical arguments, derives a number of concepts and scaling parameters, and finally makes estimates of the fluctuating pressure characteristics for a large hammerhead configuration. The significant findings are as follows: (1) All the fluctuating pressure fields examined seem to indicate a strong influence of a square-wave type of random fluctuation in the low-frequency region; (2) A square-wave type of pressure fluctuation can arise from the random oscillation of the separation point because of stream-wise disturbances or cross-stream disturbances, or from the intermittency of a free boundary; (3) In a narrow range of high subsonic Mach numbers, a periodic modulation of the random pressure fluctuation can arise from shock-wave oscillation. (4) The turbulence field seems to have a 'memory' - a short one at least. (5) The large eddies in the turbulence field apparently dominate the statistical properties; (6) The magnitude of the fluctuating pressures seems to be linearly dependent upon the mixing region or shear layer thickness and can be enhanced by a positive pressure gradient. (7) The unsteadiness of the separation surface behind the backward-facing step of a hammerhead configuration can be visualized as a series of 'teeter-totters' lined up side-by-side around the perimeter and randomly going up-and-down. Thus, a revolving motion of the hammerhead about the flow axis might be induced. (Author)
AD-657 013 HC$3.00 MF$0.65

HYPERSONIC STABILITY DERIVATIVES FOR A STANDARD 10 DEGREE CONE.
Final rept.,
Aerospace Research Labs Wright-Patterson AFB Ohio
Otto Walchner, Frank Sawyer, Brian Quinn, and Eric Friberg. May 67, 27p Rept no. ARL-67-0099

Descriptors: (*Conical bodies, *Hypersonic characteristics), Oscillation, Stability, Pitch (Motion), Moments, Mach number, Angle of attack, Wind tunnel models.

The report describes experiments on the stability of an STA standard 10 degree cone. The free oscillation experiments on a sting mounted, open base model used an Optron tracker to register the model's oscillation about zero angle of attack. Values of the static and dynamic pitching moment stability derivatives are given for independent combinations of nine initial oscillation amplitudes (between 1/2 degrees and 5 degrees), five reduced frequencies (omega d/2V between .0025 and .007), two

pivot axis locations (x sub cg/l = 55% and 60%), and two nominal Mach numbers (M = 12 and 14). (Author)
AD-657 027 HC$3.00 MF$0.65

MOTION AND DECAY OF A VORTEX RING.
Revised ed.,
New York Univ N Y Dept of Aeronautics and Astronautics
C. Tung, and L. Ting. 1 Feb 67, 13p Rept no. NYU-AA-67-101
AFOSR-67-0077
Grant AF-AFOSR-1062-66
Revision of Manuscript submitted 14 Jul 66.
Availability: Published in The Physics of Fluids, v10 n5 p901-10, 5 May 1967.

Descriptors: (*Vortices, Fluid dynamic properties), Motion, Relaxation time, Axially symmetric flow, Boundary layer, Velocity, Mathematical analysis.

In the classical inviscid theory of a vortex ring, the velocity at a point near the vortex ring becomes singular due to terms of 1/r and ln r where r is the shortest distance from the point to the vortex ring. Also the velocity of the vortex ring depends on the logarithm of the effective radius of the cross section of the vortex ring and is infinite for zero radius. In the present paper the effect of the viscosity in the inner core of the vortex ring is included and the inner viscous solution is matched with classical inviscid solution of the outer region by the boundary layer technique. By means of the systematic matching, the singularities of 1/r and ln r in the classical inviscid theory is removed. By the requirement that the velocity at the center of the viscous core is finite, a unique and finite value is obtained for the velocity of the translation of the vortex ring which is decreasing with respect to time as-ln (nu tau) where nu is the kinematic viscosity. From this analysis, the effective radius of the cross-section of the vortex ring can be identified as 2 (nu tau) to the 1/2 power. The variable tau is transformed from the time variable t by the relationship tau = the integral from zero to t R (t')dt'/R (t), where R (t) is the radius of the ring. (Author)
AD-657 042 Not available from CFSTI

THE RELATIVE IMPORTANCE OF BROWNIAN DIFFUSION AND OTHER FACTORS IN AEROSOL FILTRATION.
Electronic Systems Div L G Hanscom Field Mass
Decision Sciences Lab
For primary bibliographic entry see Field 15B.
AD-657 082 Not available from CFSTI.

SUBSONIC WIND TUNNEL WALL CORRECTIONS,
Advisory Group for Aerospace Research and Development Paris (France)
H. C. Garner, E. W. E. Rogers, W. E. A. Acum, and E. C. Maskell. Oct 66, 464p Rept no. AGARD-ograph-109
NATO Furnished.

Descriptors: (*Subsonic flow, Interference), Wind tunnels, Walls, Corrections, Lift, Two-dimensional flow, Wings, Three-dimensional flow.

The subject of wall interference spans nearly half a century and remains a field of active research. The classical theories of lift and blockage interference in two-dimensional and three-dimensional tunnels are now highly developed for steady subsonic flows without separation in fully closed or open tunnels. Oscillatory experiments, cases of separated flow, and tunnels with slotted or perforated walls can be treated by more recent analysis, but results are relatively limited. The theoretical background is reviewed and modern developments in the formulation, calculation and application of interference corrections are discussed in seven chapters. Chapter I gives a general review and lists areas in which further research is needed. Each of the more specialized chapters contains selected graphs of numerical data and a summary or table of principal formulae. (Author)
AD-657 092 HC$3.00 MF$0.65

APPROXIMATE ANALYTIC SOLUTIONS FOR NONSIMILAR BOUNDARY LAYERS.
Revised ed.,
New York Univ N Y
Charles J. Ruger. 14 Dec 66, 11p
ARL-67-0131
Contract AF 33 (615)-2215
Revision of manuscript submitted 3 Aug 66. Doctoral thesis.
Availability: Published in AIAA Journal v5 n5 p923-9 May 1967.

Descriptors: (*Boundary layer, Approximation (Mathematics)), Partial differential equations, Linear systems, Injection, Skin friction, Shear stresses.

The Crocco equation for zero pressure gradient and a constant viscosity density product is linearized and the results applied to boundary-layer problems where the given initial profile is much different from the Blasius profile. Four linearization assumptions are used, each of which leads to an eigenvalue problem having a discrete spectrum of eigenvalues. This allows the shear stress to be expressed as a series. Far downstream of the initial station the first term of this series dominates. Solutions valid in this region are obtained for each assumption and are compared to the exact similar solution. The best assumptions are applied to two examples where it is desired to find the skin friction behind a region having mass injection. Comparison to finite difference solutions shows the present solution to be satisfactory and superior to solutions obtained by perturbations from the Blasius solution. The accuracy of the solution is improved by making multiple linearization assumptions in the streamwise direction and application is made to the problem of free mixing in the vicinity of a flat wall. (Author)
AD-657 095 Not available from CFSTI.

AN EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF SEVERAL TYPES OF SURFACE ROUGHNESS ON TURBULENT BOUNDARY LAYER CHARACTERISTICS AT SUPERSONIC SPEEDS,
Texas Univ Austin Defense Research Lab
Felix W. Fenter, and W. C. Lyons, Jr. 6 Feb 53, 63p Rept no. DRL-411
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab. CF-2676.

Descriptors: (*Turbulent boundary layer, *Surface roughness), (*Supersonic flow, Turbulence), Flat plate models, Skin friction, Drag.

A theory is described which can be used to predict accurately the skin friction drag of surfaces with uniform grain-type roughness. The roughness does not necessarily have to extend to the leading edge of the surface for an accurate calculation to be made. Uniform surface roughness composed of spherical beads does not affect the boundary layer in a manner significantly different from grain-type roughness, provided that the grains and the spheres are bonded to the surface in a similar manner. Consequently, the theory accurately predicts the effects of spherical roughness elements on skin friction under these conditions. The effect of a given type of roughness on turbulent boundary layer characteristics is strongly dependent upon the density of distribution of the roughness elements. The effect of maximum density V-grooves on turbulent boundary layer characteristics is dependent upon the sweepback angle. The effect of increasing sweepback is to reduce the skin friction drag. (Author)
AD-657 134 HC$3.00 MF$0.65

THE DESIGN OF AN ACCELERATION INSENSITIVE SKIN FRICTION BALANCE FOR USE IN FREE FLIGHT VEHICLES,
Texas Univ Austin Defense Research Lab
For primary bibliographic entry see Field 14B.
AD-657 135 HC$3.00 MF$0.65

INTERFERENCE EFFECTS DUE TO RELATIVE PROXIMITY OF STATIC-PRESSURE PROBES IN SUPERSONIC FLOW,
Texas Univ Austin Defense Research Lab
For primary bibliographic entry see Field 14B.
AD-657 139 HC$3.00 MF$0.65

COMPUTATION OF EXIT-FLOW AND OVERFLOW COEFFICIENTS,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
R. von Mises. May 56, 60p Rept no. CF-2522
TT-67-62658
Contract NOrd-7386
Trans. of Verein Deutscher Ingenieure. Zeitschrift (West Germany) v61 n21 26 May; n22 2 Jun; n23 9 Jun 1917.

Descriptors: (*Fluid flow, Orifices), Laminar flow, Partial differential equations, Axially symmetric flow, West Germany.

The theory of fluid jets founded by Helmholtz can be applied to the computation of the technically important exit-flow coefficients. A complete analysis leads to numerical results which well agree with the findings of experiments. The most useful results concern the topics as follows: Symmetrical orifice in a horizontal plane; lateral orifice in an infinite wall oriented at right angles to the exit flow; the effects of assymmetry; simultaneous exit from a bottom and lateral opening; perfect, straight overflow.
AD-657 143 HC$3.00 MF$0.65

FEASIBILITY OF A DIRECT EXPERIMENTAL TEST OF LIGHTHILL'S THEORY OF AERODYNAMIC SOUND USING FOCUSING TECHNIQUES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 20A.
AD-657 159 HC$3.00 MF$0.65

ROCKET TUNNEL GAS PROPERTIES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
F. K. Hill. 12 Sep 57, 20p Rept no. CF-2680
Contract NOrd-7386

Descriptors: (*Supersonic wind tunnels, *Gas flow), Rocket motors (Solid propellant), Specific heat, Mixtures, One-dimensional flow, Equations of state, Shock waves Mathematical analysis.

An analysis was made of the specific heat, wind tunnel expansion processes, and shock wave properties of gas mixtures in a solid propellant rocket driven supersonic wind tunnel.
AD-657 160 HC$3.00 MF$0.65

APPROXIMATE METHOD OF DETERMINING THE CONCENTRATION FIELD IN A TURBULENT GAS JET.
APL library bulletin translations series,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
K. A. Malinovskii. 7 Jun 67, 11p Rept no. TG-230-T-527
TT-67-62662
Contract NOw-62-0604
Trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika Zhidkosti i Gaza, n1 p110-2 1967.

Descriptors: (*Jets, *Gas analysis), Concentration (Chemistry), Turbulence, Thermal analysis, Gas flow, Jet mixing flow, Weight, Enthalpy, USSR.

A technique is developed for determining the concentration field of the components of a turbulent gas flow from the temperature field in the mixture. The given procedure simplifies determination of the turbulent mixing intensity. (Author)
AD-657 163 HC$3.00 MF$0.65

ON MENARD INSERTS IN SUPERSONIC NOZZLES.
Michigan Univ Ann Arbor Office of Research Administration
For primary bibliographic entry see Field 14B.
AD-657 177 HC$3.00 MF$0.65

DER AERODYNAMISCHE WARMESCHUTZ BEIM HOCHGESCHWINDIGKEITSFLUG (Aerodynamic Heat Protection in High Velocity Flight),
Deutsche Versuchsanstalt Fuer Luft-Und Raumfahrt E V Freiburg-Im-Breisgau (West Germany)
Ernst Adams. 1965, 13p Rept no. DVL-603
Text in German.
Availability: Published in Jahrbuch 1965 der WGLR nd 130.

Descriptors: (*Aerodynamic heating, Heat shields), (*Spacecraft, Ablation), Atmosphere entry, Heat transfer, Metals, Mathematical analysis, West Germany.

At minimum weight, aerodynamic heat protection systems are supposed to maintain both temperature and heat flow as low as possible at the inner surfaces of a space vehicle. Consequently, the heat penetration of the system is to be impeded and the net heat flow entering the system is to be minimized as compared to the gross heat flow. Subsequently to a review of aerodynamic heating, the performance of metals and ablation-type materials is discussed. In particular, the pertinent physical processes are outlined and correlation formulae are presented. (Author)
AD-657 218 Not available from CFSTI.

VARIATIONAL APPROACH TO RAREFIED FLOWS IN CYLINDRICAL AND SPHERICAL GEOMETRY,
Applicazioni E Ricerche Scientifiche S P A Milan (Italy)
Carlo Cercignani, and Carlo D. Pagani. 1967, 21p
AFOSR-67-1913
Contract AF 61 (052)-881
Prepared in cooperation with Milan Univ. (Italy). Istituto di Scienze Fisiche.
Availability: Published in Rarefied Gas Dynamics 5th Symposium v1 p555-73 1967.

Descriptors: (*Superaerodynamics, Mathematical analysis), Cylindrical bodies, Spheres, Heat transfer, Functions, Knudsen number, Italy.
Identifiers: Poisuille flow.

The variational method previously developed by the authors is applied to cylindrical Poiseuille flow and heat transfer from a sphere. Very simple trail functions yield very accurate approximations to flow rate and heat flux, respectively. Comparisons with theoretical and experimental results are made. (Author)
AD-657 230 Not available from CFSTI.

THE PROBLEM OF A CYLINDER ROTATING IN A RAREFIED GAS,
Applicazioni E Ricerche Scientifiche S P A Milan (Italy)
Piero Bassanini, Carlo Cercignani, and Paolo Schwendimann. 1967, 14p
AFOSR-67-1915
Contract AF 61 (052)-881
Prepared in cooperation with Milan Univ. (Italy). Istituto di Scienze Fisiche.
Availability: Published in Rarefied Gas Dynamics 5th Symposium v1 p505-16 1967.

Descriptors: (*Superaerodynamics, Cylindrical bodies), (*Cylindrical bodies, Rotation), Numerical analysis, Approximation (Mathematics), Integral equations, Drag, Italy.

The problem of a cylinder rotating in a rarefied gas is solved numerically and compared with an approximate analytical solution. (Author)
AD-657 232 Not available from CFSTI.

SOME RESULTS ABOUT A KINETIC MODEL WITH VELOCITY-DEPENDENT COLLISION FREQUENCY,
Applicazioni E Ricerche Scientifiche S P A Milan (Italy)
Carlo Cercignani, and Franco Sernagiotto. 1967, 16p
AFOSR-67-1914
Contract AF 61 (052)-881
Prepared in cooperation with Milan Univ. (Italy). Istituto di Scienze Fisiche.
Availability: Published in Rarefied Gas Dynamics 5th Symposium v1 p381-94 1967.

Descriptors: (*Superaerodynamics, Mathematical models), Velocity, Frequency, Integral equations, Italy.

A linearized kinetic model with a collision frequency depending on the magnitude of the molecular velocity is studied. Typical unsteady problems are shown to be amenable to analytical solution. In particular the problem of propagation of forced waves in a half-space is discussed and the dependence of the asymptotic behavior on the form of the collision frequency emphasized. (Author)
AD-657 233 Not available from CFSTI.

NON-LINEAR HEAT TRANSFER BETWEEN TWO PARALLEL PLATES ACCORDING TO A MODEL WITH CORRECT PRANDTL NUMBER,
Applicazioni E Ricerche Scientifiche S P A Milan (Italy)
Carlo Cercignani, and Gino Tironi. 1967, 15p
AFOSR-67-1916
Contract AF 61 (052)-881
Prepared in cooperation with Milan Univ. (Italy). Istituto di Scienze Fisiche.
Availability: Published in Rarefied Gas Dynamics 5th Symposium v1 p441-53 1967.

Descriptors: (*Heat transfer, Mathematical models), (*Gas flow, Heat transfer), Prandtl number, Nonlinear systems, Structural parts, Differential equations, Italy.

A non-linear model of the Boltzmann equation is studied. The model is shown to imply the conservation equations, to allow the Prandtl number to assume any value between 2/3 and 1 and to be the simplest element of a large class of non-linear models. The model is applied to the problem of heat transfer between parallel plates and shown to introduce slight modifications to previous results obtained with the BGK model. (Author)
AD-657 235 Not available from CFSTI.

A COLLECTION OF SOME CONTROLLED SURFACE THERMAL ACCOMMODATION COEFFICIENT MEASUREMENTS,
Missouri Univ Columbia Physical Chemical Lab
Lloyd B. Thomas. 1967, 10p
AFOSR-67-1921
Grant AF-AFOSR-94-63
Availability: Published in Rarefied Gas Dynamics 5th Symposium v1 p155-62 1967.

Descriptors: (*Helium group gases, *Heat transfer), (*Tungsten, Surfaces), (*Alkali metals, Surfaces), Superaerodynamics, Interactions, Thermal properties, Adsorption, Tables.
Identifiers: Thermal accomodation coefficients.

A summary is given of the results of thermal accomodation studies of systems involving the impingement of nobel gases on tungsten and alkali metals, and on clean tungsten as the absorption of alkali metal occurs. Selected work done in other laboratories is also very briefly summarized.
AD-657 242 Not available from CFSTI.

PRELIMINARY RESULTS OF A NEW FORMULATION OF THE HYPERSONIC LEADING EDGE FLOW PROBLEM,
Defense Research Corp Santa Barbara Calif
J. A. Laurmann. 1967, 17p
AFOSR-67-1936
Contract AF 49 (638)-1569
Availability: Published in Rarefied Gas Dynamics, 5th Symposium v2 p955-69 1967.

Descriptors: (*Hypersonic flow, *Leading edge), (*Flat plate models, Hypersonic flow), Continuum mechanics, Shock waves, Approximation (Mathematics), Partial differential equations, Mach number.

Some results of a continuum flow analysis for the leading edge region of a flat plate are presented. The method employs a simplified model for the flow based upon a hypersonic thin layer type of approximation using slip boundary conditions. Preliminary calculations indicate that the model is in fair agreement with experiment in the merged and in the shock formation regions as well as giving a qualitatively correct representation for distances somewhat closer to the leading edge. (Author)
AD-657 269 Not available from CFSTI.

AN INVESTIGATION OF AERODYNAMIC CONTROLS AT HYPERSONIC MACH NUMBERS.
Final rept.,
Aerospace Research Labs Wright-Patterson AFB Ohio
Anthony W. Fiore. May 67, 170p Rept no. ARL-67-0030

Descriptors: (*Wings, Aerodynamic control surfaces), (*Aerodynamic control surfaces, *Hypersonic characteristics), Leading edge, Trailing edge, Angle of attack, Deflection, Pressure, Moments.

A research program was conducted to investigate the behavior of a flat plate wing with a semi-cylindrical leading edge at a Mach number of 13.87 and a Reynolds number, based on the leading edge thickness, of 3935.0. The wing was investigated with both a trailing and leading edge control surface. Data were obtained at various combinations of angles of attack and control surface deflections. Pressure distributions for each control surface location, in the presence of combined separated and expansion type flow fields, were obtained. These pressure distributions were integrated and the resulting two-dimensional force and moment coefficients, lift-to-drag ratio, and location of the center of pressure were compared with inviscid theory. The results of the research are presented in three groups; the first series of tests were conducted at various angles of attack for the case where the control surface was not deflected. The second series of data indicate the effect of cross-flow through an open gap between the wing and the control surface on the local pressure distribution. Finally, the third group of data present the experimental data with theoretical correlation of such parameters as control effectiveness and aerodynamic hinge moments for both the trailing edge and leading edge control surface location at various angles of attack. (Author)
AD-657 285 HC$3.00 MF$0.65

OPERATION INSTRUCTIONS AND DESCRIPTION OF COMPUTER PROGRAM FOR FINITE DIFFERENCE SOLUTIONS OF THE LAMINAR COMPRESSIBLE BOUNDARY LAYER EQUATIONS IN THE VON MISES VARIABLES,
New York Univ N Y Dept of Aeronautics and Astronautics
Faiza Nabi. May 67, 78p Rept no. NYU-AA-66-59
ARL-67-0098
Contract AF 33 (615)-2215

Descriptors: (*Laminar boundary layer, Numerical analysis), (*Compressible flow, Computer programs), Difference equations, Flow charting, Subroutines.

The report is designed to give a detailed description of the numerical solution of a compressible boundary layer. It presents the methods of operation as well as the listing and flow chart of the programming so as to enable the user to perform some changes if necessary. The program, henceforth referred to as DORITH, is written in FORTRAN II language and has been operated at both IBM 7094 and CDC 6600 installations. It occupies (44500) sub 8 = (18752) sub 10 memory locations and requires the system subroutines SQRTF and ABSF. (Author)
AD-657 322 HC$3.00 MF$0.65

BLANCH ANNIVERSARY VOLUME,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 12A.
AD-657 323 HC$3.00 MF$0.65

THE EFFECT OF SEVERE NOSE BLUNTNESS ON THE STABILITY OF SLENDER CONES IN HYPERSONIC FLOW,
Aerospace Research Labs Wright-Patterson AFB Ohio
Brian Quinn. May 67, 33p Rept no. ARL-67-0101

Descriptors: (*Conical bodies, Stability), (*Nose cones, Hypersonic characteristics), Slender bodies, Blunt bodies, Hypersonic flow, Reentry vehicles, Equations of motion, Shock waves, Pitch (Motion).

The flow around a blunted slender cone performing pitching oscillations is theoretically analyzed by means of Chernyi's blast-wave piston analogy. Stationary and transient shock shapes and pressure distributions are presented in power series form. Within the region of applicability, the stationary pressure agrees well with Chernyi's numerical integration. Normal force and pitching moment coefficient derivatives are presented and the results are plotted for a 10 degree cone. The theoretical static and dynamic stability derivatives agree satisfactorily with recent experiments in a Mach 14 wind tunnel. It is concluded that the experimentally observed reduction in static and dynamic stability due to increased nose bluntness may be attributed to blast wave effects. (Author)
AD-657 325 HC$3.00 MF$0.65

DOME EFFECTIVENESS AND THE SCALING AND AREA DEPENDENCE OF BOUNDARY-LAYER PRESSURE SPECTRA VIEWED WITH REGARD TO CHARACTERISTIC WAVENUMBER RANGES,
Trg Inc Melville N Y
For primary bibliographic entry see Field 17A.
AD-657 371 HC$3.00 MF$0.65

CALCULATION OF RADIANT FLUX IN A LAMINAR BOUNDARY LAYER,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
G. N. Andreev. 1 Sep 61, 7p Rept no. TG-230-T247
TT-61-31626
Contract NOrd-7386
Trans. of Akademiya Nauk SSSR. Otdelenie Tekhnicheskikh Nauk. Izvestiya: Mekhanika i Mashinostroenie (USSR) n6 p109-111 1960.

Descriptors: (*Laminar boundary layer, Thermodynamics), Thermal radiation, Flat plate models, Reynolds number, Equations of motion, Mathematical analysis, USSR.

The transverse component of the radiant flux is mathematically analysed.
AD-657 372 HC$3.00 MF$0.65

GAS KINETIC EQUATIONS AND THEIR APPLICATIONS TO NONEQUILIBRIUM FLOWS WITH DIFFUSION AND CHEMICAL REACTION,
Ohio State Univ Research Foundation Columbus Dept of Aeronautical and Astronautical Engineering
Ting Yi Li. 1966, 24p
Contract Nonr-2168 (03)
Availability: Published in Dynamics of Fluids and Plasmas p155-78 1966.

Descriptors: (*Nonequilibrium flow, Equations of motion), Diffusion, Chemical reactions, Thermodynamics, Quantum mechanics, Differential equations, Gas flow, Mixtures.

In dealing with the diffusion problem, the Boltzmann equation is given for the distribution function of each component gas. Important effects of diffusion velocities and nonuniform temperatures of the component gases were demonstrated. An examination was made of the problems of the flows of rarefied gaseous mixtures under conditions of large departures from equilibrium. For flows of reacting gases, Bhatnagar-Gross-Krook's approximation for the right-hand side of the Boltzmann equation is adopted. Special considerations of the transfer of momentum and of energy associated with reactive and nonreactive collisions are given, and their effects on the flow equations are studied. An attempt was made to simplify an extended form of the Boltzmann equation which deals with a realistic kinetic model of the reacting gaseous mixture. This simplified model gas kinetic equation preserves the basic features that characterize the nonequilibrium reacting flows.
AD-657 387 Not available from CFSTI.

LAW OF THE WALL FOR TURBULENT BOUNDARY LAYERS IN COMPRESSIBLE FLOW.
Revised ed.,
Pennsylvania State Univ University Park
H. Tennekes. 22 Sep 66, 4p
Contract NOw-65-0123
Revision of manuscript submitted 11 Apr 66.
Availability: Published in AIAA Journal v5 n3 p489-92 Mar 1967.

Descriptors: (*Turbulent boundary layer, Walls), (*Compressible flow, Boundary layer), Approximation (Mathematics), Adiabatic gas flow, Hypersonic flow, Transformations (Mathematics), Equations of motion.
Identifiers: Similarity theory.

A similarity law is proposed for the wall region of turbulent boundary layers in compressible flow along adiabatic walls. The proposed law of the wall is rather closely related to the law of the wall resulting from Coles' transformation theory of turbulent boundary layers in compressible flow. The present analysis deviates from the one given by Coles in that no use is made of Howarth-Dorodnitsyn variables. A specific aspect of the similarity analysis is illustrated through the derivation of a hypersonic law of the wall. (Author)
AD-657 388 Not available from CFSTI.

PROBLEMI DI PROPAGAZIONE PER EQUAZIONI NON LINEARI DELLA FISICA MATEMATICA (Problems of Propagation through Non Linear Equations of Mathematical Physics),
Politecnico Di Milano (Italy) Istituto Di Matematica
For primary bibliographic entry see Field 12A.
AD-657 395 Not available from CFSTI.

AERODINAMICA RELATIVISTICA (Relativistic Aerodynamics),
Politecnico Di Milano (Italy) Istituto Di Matematica
Bruno Finzi. 1966, 13p Rept no. Pub-439
Text in Italian.
Availability: Published in Atti e Memorie della Academia Nazionale di Scienze, Leffere e Arti di Modena v8 p3-10 1966.

Descriptors: (*Aerodynamics, Relativity theory), Equations, Enthalpy, Italy.
AD-657 396 Not available from CFSTI.

SOLUTION OF NONLINEAR FLOW PROBLEMS THROUGH PARAMETRIC DIFFERENTIATION,
Massachusetts Inst of Tech Cambridge
Paul E. Rubbert, and Marten T. Landahl. 29 Sep 66, 7p
AFOSR-67-1900
Grant AF-AFOSR-156-65
Prepared in cooperation with The Boeing Co., Renton, Washington.
Availability: Published in The Physics of Fluids v10 n4 p831-5 Apr 1967.

Descriptors: (*Fluid flow, *Continuum mechanics), (*Nonlinear differential equations, *Boundary value problems), Integration, Partial differential equations, Perturbation theory, Airfoils, Transonic characteristics, Operators (Mathematics), Convergence.

A method of obtaining solutions to nonlinear problems by integrating the rate of change of the solution with respect to a suitable parameter is described. The advantage of this method is that the nonlinearity of the problem is confined to a first order equation where it causes little difficulty. The Falkner-Skan boundary-layer problem and the problem of flow about a nonlifting airfoil at transonic speeds are used to illustrate the method. (Author)
AD-657 405 Not available from CFSTI.

DER AERODYNAMISCHE WAERMESCHUTZ VON FLUGKOERPERN UNTER BESONDERER BERUECKSICHTIGUNG DER ABLATIONSTECHNIK (Aerodynamic Heat Protection for Flight Vehicles with Special Consideration of Ablation Techniques),
Deutsche Versuchsanstalt Fuer Luft-Und Raumfahrt E V Freiburg-Im-Breisgau (West Germany)
E. Adams. 1966, 8p
Text in German.
Availability: Published in Raumfahrttechnik v12 n11 p289-95 1966.

Descriptors: (*Aerodynamic heating, Reentry vehicles), (*Ablation, Atmosphere entry), Materials, West Germany.
Identifiers: Ablative materials.
AD-657 415 Not available from CFSTI.

FLUID MECHANICS RESEARCH.
Cornell Univ Ithaca N Y Graduate School of Aerospace Engineering
For primary bibliographic entry see Field 20I.
AD-657 429 HC$3.00 MF$0.65

AN ANALYTICAL INVESTIGATION OF THE FLAT PLATE TURBULENT BOUNDARY LAYER IN COMPRESSIBLE FLOW,
Naval Ordnance Lab White Oak Md
Neal Tetervin. 15 May 67, 141p Rept no. NOLTR-67-39, Aerodynamics Research-286

Descriptors: (*Turbulent boundary layer, *Flat plate models), (*Skin friction, Turbulent boundary layer), (*Heat transfer coefficients, Turbulent boundary layer), Compressible flow, Vortices, Viscosity, Diffusion, Prandtl number, Mach number.

The concepts of eddy kinematic viscosity and eddy diffusivity are used to calculate skin friction and heat transfer coefficients for the turbulent boundary layer on a flat plate. The eddy kinematic viscosity, eddy diffusivity, and turbulent Prandtl number vary across the boundary layer. The Mach number range is from zero to ten. The surface to stream temperature ratio varies from one-half to eight, and includes the insulated surface. The friction results are compared with experimental data.

Velocity and temperature profiles for the entire region from the surface to the outer edge are compared with experimental data. (Author)
AD-657 456 HC$3.00 MF$0.65

SKIN-FRICTION DRAG AT SUPERSONIC-HYPERSONIC SPEEDS WITH TRANSITION.
Revised ed.,
Ara Inc West Covina Calif
Mei-Kao Liu. 30 Dec 66, 4p
AFOSR-67-1956
Contract AF 49 (638)-1309
Revision of manuscript submitted 4 Aug 66.
Availability: Published in Journal of Aircraft p264-5 May/Jun 1967.

Descriptors: (*Wings, Drag), (*Hypersonic flow, Skin friction), Supersonic flow, Reynolds number, Boundary layer, Turbulence, Mathematical analysis, Delta wings, Aircraft, Spacecraft.

Skin-friction coefficients at various Mach numbers are determined as a function of Reynolds number after determining the location of the transition as a fraction of wing-chord,a. The resulting values are compared with those presented by M. H. Bertram, Boundary-Layer displacement effects in air at Mach numbers of 6.8 and 9.6, NASA TR R-22 (1959) and Van Driest, E.R., Turbulent boundary layer in compressible fluids, J. Aeronaut. Sci. 18, 145-160 (1951) although the results for the laminar case, a=1.0, agree with Bertram, the results for the turbulent region, a=0, do not agree. The turbulent skin-friction drag based on the present paper does agree, however, with the results given by Van Driest. Consequently, when the experimental data is compared with the theoretical curves for various values of a, the interpretation of the data with respect to the amount of turbulent and laminar flow that exists is subject to question. (Author)
AD-657 519 Not available from CFSTI.

APPLICATION OF THE LIFTING FOIL THEORY SOLVED BY RHEOELECTRIC ANALOGY TO THE CALCULATION AND DESIGN OF SUB AND SUPER CAVITATING PROPELLERS FINAL REPORT.
Bureau D Analyse Et de Recherche Appliquees, Boulogne-billancourt (France).
For primary bibliographic entry see Field 13J.
For abstract, see STAR 05 19.
N67-32791 HC$3.00 MF$0.65

EXPERIMENTAL ANALYSIS OF THE NEAR-WAKE OF A SLENDER BODY WITH NO LATERAL SUPPORT.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 19.
N67-33336 HC$3.00 MF$0.65

RESEARCH AND DEVELOPMENT PROGRAMS QUARTERLY REPORT, JAN. - MAR. 1967.
Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
Mar 67, 63p NASA-CR-87061, U-RQR-67-1
Contract NASA ORDER R-76, NOW-62-0604-C

Descriptors: *Boundary layer, *Guided missile, *Microelectronics, *Plasma dynamics, *Radar scattering, *Thermal stress, Aerodynamics, Array, Boundary, Combustion, Dynamics, Film, Flow, Guide, Layer, Maser, Missile, Mixing, Model, Optimization, Phase, Plasma, Radar, Radome, Research, Scattering, Semiconductor, Stability, Stress, Thermal, Thin, Trajectory, Turbulent.

For abstract, see STAR 05 19.
N67-33361 HC$3.00 MF$0.65

HEAT TRANSFER IN A PLANE INCOMPRESSIBLE LAMINAR JET.
Florida Univ., Gainesville. Dept. of Aerospace Engineering.
K. Millsaps, and N. L. Soong. Feb 67, 9p NASA-CR-87311
Grant NSG-542

Descriptors: *Differential equation, *Heat transfer, *Laminar jet, *Similarity number, Component, Differential, Distribution, Energy, Equation, Incompressible, Jet, Laminar, Legendre function series, Number, Partial, Plane, Prandtl number, Similarity, Solution, Thermal, Transformation, Velocity.

For abstract, see STAR 05 19.
N67-33396 HC$3.00 MF$0.65

SOME SPECTRAL FUNCTIONS COMPATIBLE WITH HEISENBERG'S THEORY IN AXISYMMETRIC TURBULENCE.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
P. Salaun. 1967, 16p ONERA-TP-461/1967/
Presented At the Symp. on the Struct. of Turbulence, Southampton, Gt. Brit., 29-31 Mar. 1967

Descriptors: *Axisymmetric flow, *Heisenberg theory, *Homogeneous turbulence, *Incompressible fluid, *Tensor, Aircraft, Axisymmetry, Correlation, Engineering, Equilibrium, Flow, Fluid, Function, Homogeneity, Incompressible, Spectral, Turbulence.

For abstract, see STAR 05 19.
N67-33662 HC$3.00 MF$0.65

PARAMETRIC ANALYSIS OF ELECTROSTATIC DISPERSION OF A LIQUID.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A. Sherman. Jul 67, 22p NASA-TM-X-55850, X-734-67-321

Descriptors: *Dispersion, *Electrostatics, *Liquid surface, *Mathematical model, Charge, Conductivity, Constant, Dielectric, Drop, Electric, Liquid, Mass, Model, Prediction, Pressure, Ratio, Surface, Tension, Voltage.

For abstract, see STAR 05 19.
N67-33972 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

20E. Masers and Lasers

GROWTH OF SINGLE CRYSTAL CALCIUM ORTHOVANADATE.
Defence Research Telecommunications Establishment Ottawa (Ontario)
For primary bibliographic entry see Field 20B.
AD-656 811 Not available from CFSTI.

A NEW PREDISSOCIATION OF THE H2 MOLECULE.
National Research Council of Canada Ottawa (Ontario)
For primary bibliographic entry see Field 7D.
AD-656 949 Not available from CFSTI.

MODE INTERACTION IN A ZEEMAN LASER.
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
W. Culshaw, and J. Kannelaud. 2 Nov 66, 12p
Availability: Published in Physical Review v156 n2 p308-19 Apr 10, 1967.

Descriptors: (*Gas lasers, Interactions), Helium, Xenon, Electron transitions, Magnetic fields, Zeeman effect, Polarization, Atomic energy levels.

The interaction between modes of a short He-Xe laser using the J = 1 to 0 transition at 2.65 microns was investigated in an axial magnetic field. In zero field an elliptically polarized output usually predominates, with orientation and eccentricity changing with conditions and reflector characteristics. Neutral coupling occurs here; consequently, the system is sensitive to perturbations, in agreement with the observed erratic behavior. Small axial magnetic fields produce circular polarizations, quenching, and hysteresis effects between the two Zeeman oscillations arising from the frequency splitting of a single axial mode. A strong interaction, including sharp crossover regions in the intensities and quenching phenomena, is observed between two axial modes oscillating on well-resolved oppositely circularly polarized Zeeman components. The phenomena are studied as a function of cavity tuning, laser intensity, pressure, and magnetic field. No hysteresis was observed in the interaction between axial modes. The axial-mode intensities are equal for all positions of cavity tuning when the Zeeman separation equals the axial-mode interval. For small deviations of magnetic field from this value, however, crossover and quenching effects appear, and this allows a precise determination of the g value of the upper state. These effects are discussed on the basis of Lamb's theory and equations deduced for the interaction. The Doppler parameter Ku is about 100 Mc/sec for xenon, which is comparable with the natural linewidths, and requires a more exact discussion of the third-order atomic polarization terms. (Author)
AD-657 079 Not available from CFSTI.

RESEARCH INVESTIGATION OF LASER LINE PROFILES.
Rept. for 1 Aug 66-31 Jul 67,
United Aircraft Corp East Hartford Conn Research Labs
Anthony J. DeMaria, George L. Lamb, Jr., David A. Stetser, and Carl M. Ferrar. 28 Aug 67, 38p
Rept no. UACRL-F-920479-4
Contract N00014-66-C-0344, ARPA Order-306

Descriptors: (*Lasers, *Argons), Ion bombardment, Scattering, Excitation, Pressure, Kinetic theory, Mathematical analysis, Reflectivity, Thermal properties, Quartz, Ultrahigh frequency.

The objective of this program was to conduct experimental and theoretical investigations of laser line profiles. The broadened homogeneous line width of an argon ion laser was studied as a function of pressure and excitation by means of the 'Lamb Dip' technique. Broadened homogeneous line widths of 200 to 400 MHz were recorded. These line widths are much larger than the 100 MHz radiative line width. The most plausible source for the boradened line is nonradiative phase interruptions occuring from small-angle Coulomb scattering in ion-ion collisions. It is shown that the line width decreases with increasing pressure for a certain range of laser oscillation. A simple collision broadening approach is not applicable to the ion system because of the behavior of the ion density as a function of pressure and excitation. Preli-

minary experiments were also performed with a CO2-N2-He laser and no experimental indication of a Lamb Dip was found for this laser medium. Some aspects of the theory of a gas laser recently developed by W. E. Lamb, Jr. have been recast in a form which more fully displays the role played by the particle dynamics. It is shown that effects due to long range forces are most noticeable at long optical wavelengths and when there is a large difference between the lifetimes of the two-laser levels. (Author)
AD-657 210 HC$3.00 MF$0.65

FLUORESCENT ION INTERACTION IN LASER CRYSTALS.
Semiannual technical summary rept. for 31 May 67,
Sperry Rand Research Center Sudbury Mass
William W. Holloway, Jr. 31 May 67, 37p Rept no. SRRC-CR-67-35
Contract N00014-67-C-0266, ARPA Order-306

Descriptors: (*Lasers, *Fluorescence), (*Neodymium, Fluorescence), (*Cerium, Fluorescence), Garnet, Crystal lattice defects, Rare earth elements, Crystal growth, Doping, Emissivity, Continuous spectrum, Interactions.

Factors influencing the fluorescence of the neodymium ion in garnet crystals (especially Y3Al5O12) were investigated in order to improve the laser characteristics of these materials. In order to increase the doping levels of the active ions, the effect of compensating ions on the concentration of neodymium ions for given growth conditions was investigated. Possible deleterious effects in the optical properties of the active ion in the presence of these compensating ions were also studied. The use of energy transfer to enhance the fluorescence of the neodymium ion was considered. Energy transfer from the cerium ion to the neodymium ion was observed. In a collateral study, the optical properties of the cerium ion in garnet crystals were extensively investigated. Methods of improving the efficiency of the energy transfer in these materials were considered.
AD-657 250 HC$3.00 MF$0.65

SUMMARY OF THE DEVELOPMENT OF OPTICAL WAVEGUIDES AND COMPONENTS.
Wheeler Labs., Inc., Great Neck, N. Y.
E. R. Schineller. Aug 67, 61p NASA-CR-860, REPT.-1471
Contract NAS12-2
Refs

Descriptors: *Laser, *Optical equipment, *Waveguide, Coupler, Design, Detector, Dielectric, Direction, Equipment, Fabrication, Filter, Mode, Modulator, Optical, Propagation, Single, Solid, Test.

For abstract, see STAR 05 19.
N67-33158 HC$3.00 MF$0.65

NEW SYSTEMS OF TRAJECTOGRAPHY.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 22D.
For abstract, see STAR 05 19.
N67-33959 HC$3.00 MF$0.65

20F. Optics

PHOTOELECTRONIC PROCESSES IN ZnS SINGLE CRYSTALS.
Revised ed.,
Stanford Univ Calif Dept of Materials Science
Chang S. Kang, Beverley P. Phipps, and Richard H. Bube. 19 Dec 66, 15p
AROD-4119:15
Contract DA-31-124-ARO (D)-73
Doctoral thesis. Revision of manuscript submitted 19 Oct 66.
Availability: Published in The Physical Review v156 n3 p998-1009 Apr 15 1967.

Descriptors: (*Zinc sulfides, Luminescence), Band spectrum, Theses, Crystal growth, Crystal structure, Photoconductivity, Hall effect, Single crystals, Carriers (Semiconductors), Band theory of solids, Quenching (Inhibition), Models (Simulations), Optical properties.

A simultaneous series of luminescence and photoelectronic measurements as a function of excitation energy, intensity, and temperature were made on ZnS:Cu:Cl single crystals grown by a chemical-transport method. Hall-effect measurements show that the charge carriers under steady-state excitation are electrons, and optical quenching of thermally stimulated luminescence and conductivity is found to be identical with steady-state optical quenching. Various models, such as those of Lambe and Klick, Klasens and Schon, Williams and Prener, and those involving unassociated pair transitions, are examined in view of all the evidence available, including the present measurements. It is concluded that a basic Klasens-Schon model is the most suitable. The measurements also show that the centers responsible for long photoconductivity lifetimes, i.e., the sensitizing centers, are not the same as the centers responsible for luminescence, i.e., luminescence-activator centers. Similar results are indicated in less detailed studies of ZnS:Cl and ZnS:Ag:Cl single crystals. (Author)
AD-656 796 Not available from CFSTI.

OPTICAL PROPERTIES OF THE INTERMETALLIC COMPOUNDS AuAl2, AuGa2 and AuIn2.
National Research Council of Canada Ottawa (Ontario) Div of Pure Physics
For primary bibliographic entry see Field 20L.
AD-656 831 Not available from CFSTI.

THE SPECTRAL REFLECTANCE OF WATER AND CARBON DIOXIDE CRYODEPOSITS FROM 0.36 TO 1.15 MICRONS.
Final rept. 1 May 65-1 May 67,
Arnold Engineering Development Center Arnold Air Force Station Tenn
B. E. Wood, A. M. Smith, and B. A. McCullough. Aug 67, 48p Rept no. AEDC-TR-67-131
Contract AF 40 (600)-1200
Prepared in cooperation with ARO, Inc., Arnold Air Force Station, Tullahoma, Tenn.

Descriptors: (*Solidified gases, Reflectivity), (*Ice, Reflectivity), (*Carbon dioxide, Reflectivity), (*Space simulation chambers, Ice), (*Planets, Reflectivity), Deposits, Spectroscopy, Substrates, Coatings, Thickness, Blackbody radiation, Computer programs, Mars (Planet), Venus (Planet).

The spectral reflectances of water and carbon dioxide cryodeposits were measured in a vacuum integrating sphere as a function of angle of incidence, substrate material, and cryodeposit thickness. Both black paint and a polished copper surface were used as substrates. Measurements were made for wavelengths between 0.36 and 1.15 microns. Cryodeposit thicknesses ranging from 0 to 2.5 mm were investigated. For large cryodeposit thickness, the reflectance was, in general, increased considerably, especially for a black substrate. For thin cryodeposit thicknesses of less than 10 microns, interference patterns were observed. A computer program was written to calculate the energy reflected from cryodeposits for 6000K blackbody irradiation. The reflectance data obtained in the present experiments may be useful for application to thermal models of planetary surfaces such as those of Mars and Venus. (Author)
AD-657 018 HC$3.00 MF$0.65

A STREAK SPECTROGRAPH WITH MICROSECOND RESOLUTION,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
For primary bibliographic entry see Field 14E.
AD-657 075 Not available from CFSTI.

OBSERVATION OF THE SPECTRUM OF LIGHT SCATTERED BY SOLUTIONS OF BIOLOGICAL MACROMOLECULES,
Massachusetts Inst of Tech Cambridge Dept of Physics
Stuart B. Dubin, Joseph H. Lunacek, and George B. Benedek. 27 Mar 67, 9p
AROD-6286:1
Contract DA-31-124-ARO (D)-425
Availability: Published in Proceedings of the National Academy of Sciences v57 n5 p1164-71 May 1967.

Descriptors: (*Polymers, Optical properties), (*Proteins, Diffusion), (*Desoxyribonucleic acids, Diffusion), Styrene plastics, Albumins, Muramidase, Viruses, Coherent radiation, Scattering, Spectroscopy.

Using a laser light source, in conjunction with an optical 'self-beat' spectrometer whose resolving power is of the order of 10 to the 14th power, the spectral distribution of light scattered by dilute solutions of several natural and synthetic macromolecules was observed, namely polystyrene latex spheres, bovine serum albumin, ovalbumin, lysozyme, tobacco mosaic virus, and deoxyribonucleic acid. From the spectrum of the scattered light, it was possible to determine the diffusion constants (D) of these macromolecules with a precision of typically 3 per cent. (Author)
AD-657 098 Not available from CFSTI.

HELICONS, MAGNETOPLASMA EDGE, AND FARADAY ROTATION IN SOLID STATE PLASMAS AT MICROWAVE FREQUENCIES,
Massachusetts Inst of Tech Cambridge National Magnet Lab
For primary bibliographic entry see Field 20L.
AD-657 105 Not available from CFSTI.

STRENGTHS, WIDTHS, AND SHAPES OF THE LINES OF THE 3nu CO BAND.
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
For primary bibliographic entry see Field 7D.
AD-657 114 HC$3.00 MF$0.65

ABSORPTION BY CO2 BETWEEN 1800 AND 2850/cm (3.5-5.6 MICRONS).
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
For primary bibliographic entry see Field 7D.
AD-657 115 HC$3.00 MF$0.65

ABSORPTION BY CO2 BETWEEN 7125 AND 8000/cm (1.25-1.40 MICRONS).
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
For primary bibliographic entry see Field 7D.
AD-657 116 HC$3.00 MF$0.65

LUMINANCE, RADIANCE, AND TEMPERATURE.
Research paper,
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
Lucien M. Biberman. Aug 67, 36p Rept no. RP-P339
IDA/HQ-67-6140
Contract DAHC15-67-C-0011

Descriptors: (*Optics, *Standards), Blackbody radiation, Accuracy, Measurement, Light, Calibration, Pyrometers, Temperature, Colorimetry.

There are two definitions of light. One concerns human vision and has a set of units and standards based upon psychophysical reactions. The other

definition of light is that electromagnetic radiation in the broad spectral region where the principles of optics apply. There are no established standards for the concepts of radiance, irradiance and the related quantities under the second more general definition. This need has been recognized and one effective reference source has been proposed for serious consideration and related reference sources are under development. The appropriate units and reference standards are discussed in terms of present day practice and in terms of the accuracy and precision obtainable. The problem of the apparent discrepancy between the International Practical Temperature Scale and the Thermodynamic Kelvin Temperature Scale, to which the normal references in physics relate, is also discussed. (Author)
AD-657 166 HC$3.00 MF$0.65

RAMAN SCATTERING BY COUPLED PLASMON - LONGITUDINAL - OPTICAL - PHONON MODES IN ZINCBLENDE TYPE CRYSTALS,
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
For primary bibliographic entry see Field 20L.
AD-657 272 Not available from CFSTI.

LIGHT SCATTERING BY BANDED SPHERULITES.
Massachusetts Univ Amherst Polymer Research Inst
For primary bibliographic entry see Field 20C.
AD-657 351 HC$3.00 MF$0.65

LOW TEMPERATURE INFRARED PHOTOCONDUCTORS.
Summary rept. 31 May 66-30 Jun 67,
RCA Labs Princeton N J
Melvin L. Schultz. 22 Aug 67, 52p
Contract Nonr-2225 (00)
See also AD-636 502.

Descriptors: (*Infrared photoconductors, Cryogenics), (*Photomultipliers, Infrared photoconductors), Photoconductivity, Films, Carriers (Semiconductors), Ionization, Selenium, Lead alloys, Tellurium alloys, Germanium, Doping, Gold, Copper, Semiconductors.
Identifiers: Lead telluride.

Results obtained in the continuation of research directed toward the development of an infrared-sensitive solid tate photoconductive multiplier are reported. The principal effort has been devoted to the investigation of the suitability of amorphous Se as a material of which the carrier-accelerating layer might be made. Such a layer must permit the acceleration of carriers of one sign to energies of the order of 1 eV and, if possible, not transmit carriers of the opposite sign. The selective transport of holes excited by photon absorption in photoconductors in contact with evaporated amorphous Se films has been sought using several different photoconductors. Selectivity, to varying degrees, has been observed in some cases but not in all. Special emphasis has been placed on the use of PbTe as a photoconductor having properties similar to those of PbTe-SnTe or PbSe-SnSe planned for ultimate use. The lack of reproducibility in the transport experiments is felt to be due to uncontrolled variation in properties of the Se films. This is based on an apparent correlation between poor selectivity and abnormally low resistivity of the Se layers. The low resistivity is thought not to be due to conversion of the Se but may be associated with strains due to thermal mismatch on cooling. A method of detection of energetic carriers emerging from a Se layer based on extrinsic impact ionization of Ge:Cu at liq. He temperature has been devised. The first test was inconclusive. Recently, the investigation of Si as a material for the accelerating layer has been started. (Author)
AD-657 445 HC$3.00 MF$0.65

PROGRESS IN OPTICS RESEARCH 1964-1966 AT THE UNIVERSITY OF ARIZONA.
Technical rept.
Arizona Univ Tucson Optical Sciences
31 Jan 67, 27p Rept no. TR-15
Contracts Nonr-2173 (12), N00014-66-C-0213-A01
Research supported in part by AF and NASA.

Descriptors: (*Optics, Scientific research), Films, Spectrophotometers, Optical images, Lenses, Optical materials, Mirrors, Refraction, Illumination, Optical properties, Optical tracking, Scintillation, Optical instruments, Physics laboratories, Ultraviolet equipment, Cameras, Tests, Arizona.

Contents: Facilities; Optical design; Optical materials evaluation; Optical fabrication; Ionic figuring and polishing; Evaluation and testing; Atmospheric propagation; System applications; Image processing and restoration; Electronic image intensifiers; Target acquisition and tracking; Thin film studies; Graduate program; Optical sciences personnel; Technical reports. (Author)
AD-657 451 HC$3.00 MF$0.65

VISIBILITY ON CATHODE-RAY TUBE SCREENS: SIGNALS ON A P7 SCREEN SEEN AT DIFFERENT INTERVALS AFTER EXCITATION,
Johns Hopkins Univ Baltimore Md Dept of Psychology
A. L. Sweet, and N. R. Bartlett. 22 Oct 47, 9p
SPECDEVCEN-166-1-35
Contract N5ori-166 (01)
Availability: Published in Journal of the Optical Society of America v38 n4 p329-37 Apr 1948.

Descriptors: (*Cathode ray tube screens, Phosphorescence), (*Target position indicators, Display systems), (*Phosphorescence, Visibility), Brightness, Radar equipment, Luminescence, Optimization, Performance (Engineering), Performance (Human), Man-machine systems.

When signal images appear on the phosphorescent screen of a cathode-ray tube, they persist for some time before disappearing from view. This study investigated the visibility of gnal images on one type of screen at different intervals from excitation to final disappearance. Data were furnished by five observers viewing signal images on a P-7 screen of a PP1 cathode-ray tube. It was found that the tube bias, which sets the brightness intensity of the rotating sweep, affects both the level of visibility and the duration of visibility. Increasing the bias, and hence dimming the scope, makes the signal traces visible over a longer period of time. Greatest visibility, at intervals longer than seven seconds after excitation, was obtained at the highest bias used. For more recent signals, optimum visibility results from using a lower bias but which yet presents a dim sweep. At high biases, a signal is at maximum visibility at the instant when it is excited by the sweep. At low biases, a signal is most visible immediately after its excitation. These patterns of visibility can be explained in terms of the contrast of the brightness level of the signal image with that of the scope background and by the lessened differential sensitivity of the eye at low intensities. (Author)
AD-657 515 Not available from CFSTI.

VISIBILITY ON CATHODE-RAY TUBE SCREENS. SCREEN BRIGHTNESS,
Johns Hopkins Univ Baltimore Md
S. B. Williams, N. R. Bartlett, and E. King. 14 Jan 48, 12p
SPECDEVCEN-166-1-42
Contract N5ori-166 (01)
Availability: Published in The Journal of Psychology v25 p455-66 1948.

Descriptors: (*Cathode ray tube screens, Phosphorescence), (*Target position indicators, Display systems), (*Phosphorescence, Visibility), Brightness, Radar equipment, Luminescence, Optimization, Performance (Engineering), Performance (Human), Man-machine systems.

The report is concerned with the effect of screen brightness on the visibility, to human observers, of radar signal traces appearing on the screen of a cathode-ray tube.
AD-657 520 Not available from CFSTI.

20G. Particle Accelerators

RADIATION SAFETY TECHNICIAN TRAINING COURSE,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 16.
ANL-7291 HC$3.00 MF$0.65

FEASIBILITY STUDY OF AN ACCELERATOR-BOOSTER, FAST, PULSED RESEARCH REACTOR.
Final rept.,
General Dynamics Corp., San Diego, Calif. General Atomic Div.
C. A. Stevens, and J. R. Beyster. 25 Aug 66, 97p
Contract AT (04-3)-167

Descriptors: (*Research reactors, Reactor feasibility studies), (*Thermal neutrons, *Fast neutrons), Fast reactors, Inelastic scattering.

For abstract, see NSA 21 16.
GA-7381 HC$3.00 MF$0.65

NUCLEAR CHEMISTRY DIVISION ANNUAL REPORT, 1966,
California Univ., Berkeley. Lawrence Radiation Lab.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 21 16.
UCRL-17299 HC$3.00 MF$0.65

BROADBAND MODULATION OF HIGH-Q RESONATORS AT HIGH POWER LEVELS,
California Univ., Berkeley. Lawrence Radiation Lab.
For primary bibliographic entry see Field 9A.
For abstract, see NSA 21 16.
UCRL-17372 HC$3.00 MF$0.65

20H. Particle Physics

RATIOS OF E2 TRANSITION PROBABILITIES OF DEFORMED EVEN-EVEN NUCLEI,
Instituto de Investigacion Aeronautica Y Espacial Buenos Aires (Argentina) Laboratorio de Radiaciones
S. M. Abecasis, and H. E. Bosch. Mar 67, 39p
Rept no. LR-17
Grant DA-ARO-49-092-66-G121

Descriptors: (*Even-even nuclei, *Nuclear energy levels), Nuclear spectroscopy, Ground state, Excitation, Probability, Interactions, Argentina.

Several ratios of E2 transition probabilities between levels belonging to the ground-state, beta- and gamma-rotational bands in deformed even-even nuclei are numerically calculated within the framework of the rotation-vibration interaction model. A detailed comparison of the theoretical predictions with available experimental data is performed. The conclusion can be drawn that this model gives at the present one of the best agreement with experiment without the introduction of empirically determined parameters. (Author)
AD-656 790 HC$3.00 MF$0.65

STRUCTURE OF RESONANCES IN ELECTRON SCATTERING BY HYDROGEN ATOMS,

California Univ San Diego La Jolla
For primary bibliographic entry see Field 7D.
AD-656 792 Not available from CFSTI.

THEORY OF ATOMIC COLLISIONS WITH NEGATIVE IONS: ASSOCIATIVE DETACHMENT,
California Univ San Diego La Jolla
For primary bibliographic entry see Field 7D.
AD-656 793 Not available from CFSTI.

PHYSICAL FIELDS IN SPACE-TIME,
Politecnico Di Milano (Italy) Istituto Di Matematica
For primary bibliographic entry see Field 20J.
AD-656 852 Not available from CFSTI.

APPLICATION OF THE PARTICLE-HOLE MODEL TO ELECTRO-EXCITATION AND MUON CAPTURE IN LIGHT NUCLEI,
Naval Ordnance Lab White Oak Md
Lemmuel L. Hill. 24 May 67, 131p Rept no. NOLTR-67-88, Ballistics Research-175

Descriptors: (*Nuclear models, Matrix algebra), (*Electron bombardment, Nuclear models), (*Meson capture, Nuclear models), Parity, Nuclear energy levels, Electrons, Inelastic scattering, Nucleons, Decay schemes, Carbon, Oxygen, Silicon, Sulfur, Calcium, Excitation, Nuclear resonance.
Identifiers: Muon capture, R-matrix.

In the framework of the one-particle, one-hole model with a Serber residual interaction the negative parity J = 0, 1 and 2, T = 1 eigenstates are calculated. These results are then used to determine the E1 and M2 squared reduced matrix elements for inelastic electron scattering for values of momentum transfer from 0 to 300 MeV/c. The nucleon decay widths of the 1 (-) and 2 (-) states are calculated from R-matrix theory and used in conjunction with the E1 and M2 matrix elements and the Breit-Wigner formula to determine the excitation spectra for photonuclear and 180 deg. inelastic electron scattering reactions. In addition, the matrix elements for muon capture are calculated for all three couplings and the total muon capture rate is determined. Results are presented for each of the five, light, magic number nuclei 12C, 16O, 28Si, 32S, and 40Ca. (Author)
AD-656 901 HC$3.00 MF$0.65

EXCHANGE CONTRIBUTION IN THE SCATTERING OF ELECTRONS BY ATOMS AND POSITIVE IONS,
Joint Inst for Lab Astrophysics Boulder Colo
For primary bibliographic entry see Field 7D.
AD-656 958 Not available from CFSTI.

SYMMETRIC-RESONANCE CHARGE TRANSFER IN Ar FROM 0.1-20 eV USING MERGING BEAMS,
General Dynamics/Convair San Diego Calif Space Science Lab
For primary bibliographic entry see Field 7D.
AD-656 964 Not available from CFSTI.

THE g-FACTOR OF THE 305 keV STATE OF 48V,
Bonn Univ (West Germany) Institut Fuer Strahlen-Und Kernphysik
For primary bibliographic entry see Field 18H.
AD-657 046 Not available from CFSTI.

A STUDY OF THE SPIN DEPENDENCE OF THE NUCLEAR LEVEL DENSITY BY MEANS OF THE 89Y (n, GAMMA)90g,90mY REACTIONS WITH FAST NEUTRONS,
Lockheed Missiles and Space Co Palo Alto Calif Lockheed Palo Alto Research Lab
H. A. Grench, K. L. Coop, H. O. Menlove, and F. J. Vaughn. 1 Jul 66, 20p
Availability: Published in Nuclear Physics VA94 p157-76 1967.

Descriptors: (*Yttrium, *Neutron reactions), (*Nuclear energy levels, Yttrium), Neutron cross sections, Neutron activation, Gamma emission, Decay schemes, Nuclear isomers, Nuclear spins, Half life, Nuclear models.

The 89Y (n, gamma)90mY and 89Y (n gamma)90gY cross sections were determined at 12 neutron energies between 0.14 and 1.22 MeV. Neutrons were produced by the 7Li (p,n)7Be reaction. The ful neutron energy spread was about 65 keV. The activation cross sections were measured relative to both the 235U (n,f) cross section and the 197Au (n, gamma)198Au activation cross section. The results for the isomer ratios were compared with the predictions of the statistical theory of nuclear reactions together with a Fermi gas, level-spacing formula in order to obtain the spin cut-off factor sigma in the spin dependence of the nuclear level density. The effects of variations in the parameters in the theory were studied. Very good agreement was obtained with sigma = 3.3, assuming a gamma-ray multiplicity of 4. The 89Y (n, gamma)90mY cross section was also measured at 14.8 MeV to be 0.50 plus or minus 0.07 mb. Finally, the half-life of 90mY was found to be 3.19 plus or minus 0.01 h. (Author)
AD-657 070 Not available from CFSTI.

THE SPIN AND BRANCHING OF THE 2750-keV LEVEL IN 37K,
California Inst of Tech Pasadena
D. R. Goosman. Jul 67, 16p
Contract Nonr-220 (47)

Descriptors: (*Potassium, *Nuclear spins), Nuclear energy levels, Gamma emission, Polarization, Decay schemes, Gamma-ray spectra.

Previous work has shown that the spin of the 2750-keV level in potassium-37 is either 3/2 (+) or 5/2 (+). To resolve the ambiguity, two experiments were carried out. The linear polarization of the ground-state gamma ray from the 2750-keV level was measured. The weak cascade from the 2750-keV level through the doublet near 1.37 MeV was shown to involve the 1380-keV level. These results exclude a spin of 3/2 (+) for the 2750-keV level, and the spin is established to be 5/2 (+). (Author)
AD-657 091 HC$3.00 MF$0.65

A STUDY OF THE MECHANISM OF SEA SURFACE SCATTERING.
Polytechnic Inst of Brooklyn N Y Dept of Electrophysics
For primary bibliographic entry see Field 20N
AD-657 093 Not available from CFSTI.

CHIRAL DYNAMICS,
Harvard Univ Cambridge Mass
For primary bibliographic entry see Field 20J.
AD-657 094 Not available from CFSTI.

EQUATIONS WITH CONNECTED KERNELS FOR N-PARTICLE T OPERATORS,
Indiana Univ Bloomington
For primary bibliographic entry see Field 20J.
AD-657 267 Not available from CFSTI.

TEST-PARTICLE RELAXATION IN AN ELECTRON GAS DESCRIBED BY THE FOKKER-PLANCK KINETIC EQUATION,
Michigan Univ Ann Arbor Dept of Aerospace Engineering
R. S. B. Ong, and G. Rowlands. 1967, 17p
AFOSR-67-1912
Grant AF-AFOSR-825-65
Availability: Published in Rarefied Gas Dynamics Symposium (5th) v2 p1623-38 1967.

Descriptors: (*Gases, *Dynamics), Electrons, Particles, Relaxation time, Equilibrium, Thermal properties, Distribution functions, Plasma physics, Equations.

The approach to equilibrium of test electrons injected into an electron plasma in thermal equilibrium is investigated. In particular the establishment of a Maxwelliam distribution for the test particles as a result of like particle (electron-electron) collisions is followed. The linearized Fokker-Planck kinetic equation is used to describe this process. As a consequence of the continuous spectrum of eigenvalues of the collision operator the decay to equilibrium of the test-particles distribution function is not uniformly exponential, rather there exists various distinct stages of relaxation. These are exhibited and discussed. (Author)
AD-657 290 Not available from CFSTI.

COSMIC RAYS AS A HIGH-ENERGY PARTICLE SOURCE.
California Inst of Tech Pasadena
For primary bibliographic entry see Field 4A.
AD-657 480 Not available from CFSTI.

TECHNIQUE AND APPARATUS FOR DETERMINING THE RESPONSE OF SCINTILLATORS AND SEMICONDUCTORS TO LOW ENERGY X-RAY EXCITATION,
Stanford Univ Calif High Energy Physics Lab
D. W. Aitken, A. I. Marcum, and H. R. Zulliger. 1967, 13p Rept no. HEPL-415
AFOSR-67-1934
Contract AF 49 (638)-1499
Availability: Published in IEEE Trans. Nucl. Sci ns-13 p287-96 1967.

Descriptors: (*X-ray spectroscopy, *Semiconductors), (*X rays, *Excitation), Scintillation, Monochromators, Response, Spectrometers, Detectors, Silicon, Germanium, Halogen compounds, Crystals, Energy, Instrumentation, X-ray tubes.

The paper describes the apparatus and techniques that are being developed in our laboratory in order to investigate the response of scintillators and semiconductors to X-ray excitation. Examples of the signal-averaging technique are shown using the highly attenuated output from a precision pulse generator as the signal source. A discussion of the intended applications of the apparatus is presented. (Author)
AD-657 526 Not available from CFSTI.

PHYSICS MEASUREMENTS IN TUNGSTEN-BASED, ALUMINUM-REFLECTED FAST REACTORS,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 16.
ANL-7007 HC$3.00 MF$0.65

REACTOR PHYSICS DIVISION ANNUAL REPORT, JULY 1, 1965 TO JUNE 30, 1966.
Argonne National Lab., Ill.
Dec 66, 446p
Contract W-31-109-eng-38

Descriptors: (*Scientific research, Reports), (*Nuclear physics, *Nuclear engineering), Fast reactors, Reactor safety systems.

For abstract see NSA 21 16.
ANL-7210 HC$3.00 MF$0.65

REACTOR PHYSICS DEPARTMENT TECHNICAL ACTIVITIES QUARTERLY REPORT, OCTOBER, NOVEMBER, DECEMBER 1966.
Batelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 21 16.
BNWL-400 HC$3.00 MF$0.65

NEUTRON NOISE, WAVES, AND PULSE PROPAGATION.
Florida Univ., Gainesville.
May 67, 788p

Contract AT (40-1)-2581
Prepared for presentation at a Symposium at Univ. of Florida, Gainesville, February 14-16, 1966.

Descriptors: (*Neutron detectors, *Reactor moderators), (*Reactor kinetics, *Nuclear reactors), (*Neutrons, Excitation).

For abstract, see NSA 21 16.
CONF-660206 HC$3.00 MF$0.65

NEUTRON TOTAL AND ABSORPTION CROSS SECTIONS OF 238 PU,
Idaho Nuclear Corp., Idaho Falls.
T. E. Young, F. B. Simpson, and J. R. Berreth.
Mar 67, 81p
Contract AT (10-1)-1230

Descriptors: (*Neutron cross sections, *Plutonium), (*Radioactive isotopes, *Neutron absorption), Resonance absorption.

For abstract, see NSA 21 16.
IN-1026 HC$3.00 MF$0.65

NEUTRON CROSS SECTIONS FOR 238 PU, 242 PU, AND 244 CM,
Atomics International, Canoga Park, Calif.
C. L. Dunford, and H. Alter. 1 May 67, 142p
Contract AT (04-3)-701

Descriptors: (*Neutron cross sections, Radioactive isotopes), (*Plutonium, Neutron cross sections), (*Cerium, Neutron cross sections), Experimental data, Nuclear particles, Nuclear energy.

For abstract, see NSA 21 16.
NAA-SR-12271 HC$3.00 MF$0.65

RESEARCH IN ELECTRON PHYSICS AND PLASMA PHYSICS AT THE ROYAL INSTITUTE OF TECHNOLOGY, STOCKHOLM, SWEDEN.
Royal Inst. of Tech., Stockholm (Sweden).
For primary bibliographic entry see Field 20I.
For abstract, see STAR 05 19.
N67-33636 HC$3.00 MF$0.65

MONTE CARLO CODE FOR SOLUTION OF PLANAR ELECTRON-DIODE PROBLEMS INCLUDING ELECTRON- NEUTRAL ELASTIC COLLISIONS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
C. M. Goldstein, and P. Swigert. Aug 67, 138p
NASA-TN-D-4043
Refs

Descriptors: *Computer program, *Elastic collision, *Electron energy, *Monte carlo method, Collision, Computer, Cross section, Current, Density, Diode, Distribution, Elastic, Electron, Energy, Fortran, Program, Scattering, Transport, Velocity.

For abstract, see STAR 05 19.
N67-33639 HC$3.00 MF$0.65

THERMAL NEUTRON DEPTH DOSE DEPENDENCE ON BEAM AND PHANTOM SIZE FOR INCIDENT COLLIMATED BEAMS OF FAST NEUTRONS.
Production Group, United Kingdom Atomic Energy Authority, Annon (Scotland).
R. C. Lawson, and D. E. Watt. 1967, 20p PG-774/CC/

Descriptors: *Dosimetry, *Fast neutron, *Neutron beam, *Thermal neutron, Beam, Collimation, Dependence, Depth, Distribution, Fast, Flux, Group, Incidence, Neutron, Nuclear, Phantom, Radiobiology, Reaction, Size, Theory, Thermal, Two.

For abstract, see STAR 05 19.
N67-33658 HC$3.00 MF$0.65

THE MEASUREMENT OF W, THE AVERAGE ENERGY TO PRODUCE AN ION PAIR, FOR RECOIL NUCLEI IN CARBON DIOXIDE.
United Kingdom Atomic Energy Authority, Harwell (England). Research Group.
J. W. Leake. Jan 67, 30p AERE-R-5130

Descriptors: *Carbon dioxide, *Energy requirement, *Nuclear particle, *Pair production, *Recoil ion, *Velocity measurement, Argon, Average, Carbon, Dioxide, Effect, Elastic, Energy, Gas, Ion, Ionization, Measurement, Neutron, Nuclear, One, Pair, Particle, Production, Recoil, Recombination, Requirement, Scattering, Velocity.

For abstract, see STAR 05 19.
N67-33949 HC$3.00 MF$0.65

COSMIC RAY OBSERVATIONS IN 1964-1965 WITH MARINER IV.
State Univ. of Iowa, Iowa City. Dept. of Physics and Astronomy.
S. M. Krimigis. Jun 67, 16p NASA-CR-86988, REPT.-67-26
Grant NSG-233
Presented At the 10th Intern. Conf. on Cosmic Rays, Calgary, Canada, 19-30 Jun. 1967

Descriptors: *Cosmic ray, *Mariner iv space probe, *Particle detector, Electron, Energy, Gradient, Intensity, Interplanetary, Medium, Neutron, Proton, Solar, Thin, Threshold, Tube, Two, Window.

For abstract, see STAR 05 19.
N67-33971 HC$3.00 MF$0.65

A COMPILATION OF GAMMA RAY ANGULAR DISTRIBUTION COEFFICIENTS,
Texas Nuclear Corp., Austin.
S. C. Mathur, P. S. Buchanan, and I. L. Morgan. Aug 66, 628p
Contract AT (40-1)-2791

Descriptors: (*Gamma rays, Functional analysis), (*Inelastic scattering, *Nuclear structure), Neutron scattering, Spin.

For abstract, see NSA 21 16.
ORO-2791-21 HC$3.00 MF$0.65

APPLICATION OF THE STARS PRODUCED IN A NUCLEAR EMULSION TO THE DETERMINATION OF A HIGH NEUTRON ENERGY SPECTRUM,
California Univ., Berkeley. Lawrence Radiation Lab.
Ronald P. Omberg, and H. Wade Patterson. Feb 67, 30p
Contract W-7405-end-48

Descriptors: (*Energy, Polynomials), (*Neutrons, Detectors), Bevatrons, Cyclotrons, Neutron flux.

For abstract, see NSA 21 16.
UCRL-17063 HC$3.00 MF$0.65

NUCLEAR CHEMISTRY DIVISION ANNUAL REPORT, 1966,
California Univ., Berkeley. Lawrence Radiation Lab.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 21 16.
UCRL-17299 HC$3.00 MF$0.65

CALCULATION OF STOPPING POWER AND RANGE-ENERGY
Palmer G. Steward, and Roger Wallace. 20 Dec 66, 54p
Contract W-7405-eng-48

Descriptors: (*Computer programs, *Programming languages), (*Fission products, Experimental data), Particle accelerators, Energy, Electrons, Velocity.

For abstract, see NSA 21 16.
UCRL-17314 HC$3.00 MF$0.65

CALCULATION OF INELASTIC ELECTRON SCATTERING BY NUCLEI,
Yale Univ., New Haven, Conn. Electron Accelerator Lab.
James F. Ziegler. 1967, 294p
Contract AT (30-1)-2726

Descriptors: (*Inelastic scattering, Computer programs), (*Wave functions, *Hamiltonian), Programming (Computers), Programming languages.

For abstract, see NSA 21 16.
YALE-2726E-49 HC$3.00 MF$0.65

20I. Plasma Physics

WAVE PROPAGATION ALONG PERIODIC STRUCTURES AND PLASMA SLABS.
Leeds Univ (England) Dept of Electrical and Electronic Engineering
For primary bibliographic entry see Field 20N.
AD-656 787 HC$3.00 MF$0.65

RESEARCH LABORATORY OF ELECTRONICS QUARTERLY PROGRESS REPORT NO. 86, JULY 15, 1967,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
H. J. Zimmermann, G. G. Harvey, and S. J. Mason. 15 Jul 67, 403p
Contracts DA-28-043-AMC-02536 (E), Nonr-1841 (42)

Descriptors: (*Physics, Scientific research), (*Electronics laboratories, Reports), (*Plasma physics, Scientific research), (*Information theory, Scientific research), Molecular beams, Spectroscopy, Radio astronomy, Upper atmosphere, Electronics, Data processing systems, Data transmission systems, Speech, Linguistics, Nervous system, Psychiatry.

Contents: Molecular beams; Molecular energy transfer and spectroscopy; Microwave spectroscopy; Atomic resonance and scattering; Radio astronomy; Optical and infrared spectroscopy; Geophysical research; Magnetic resonance; Physical electronics and surface physics; Physical acoustics; Electrodynamics of media; Physical optics of invertebrate eyes; Plasma physics; Gaseous electronics; Plasmas and controlled nuclear fusion; Energy conversion research; Spontaneous radiofrequency emission from hot-electron plasmas; Interaction of laser radiation with plasmas and nonadiabatic motion of particles in magnetic fields; Statistical communication theory; Processing and transmission of information; Detection and estimation theory; Speech communication; Linguistics; Cognitive information processing; Communications biophysics; Neurophysiology; Computation research.
AD-656 868 HC$3.00 MF$0.65

IONIZING DETONATION WAVES IN TRANSVERSE ELECTROMAGNETIC FIELDS,
Strathclyde Univ Glasgow (Scotland) Dept of Mathematics
A. R. Gordon, and J. B. Helliwell. Aug 67, 12p
AFOSR-67-1879
Grant AF-EOAR-6-64
Availability: Published in J. Plasma Physics v1 pt2 p219-28 1967.

Descriptors: (*Detonation waves, *Gas ionization), Plasma medium, Electromagnetic fields, Shock waves, Propagation, Flame propagation, Great Britain.

A simple model of an ionizing detonation wave is studied in which the electrical conductivity jumps from zero to infinity across the wave at which a net release of exothermal energy occurs and which propagates with magnetoacoustic speed relative to the products of combustion. The upstream electric and magnetic fields are mutually orthogonal and transverse to the direction of pro-

pagation. The ratios of downstream flow parameters to those upstream and the detonation speed are presented for a range of values of the upstream electromagnetic field. It is surmised that, for a specified upstream magnetic field, physically realistic detonation waves exist only for a limited range of values of the electric field strength of invariant sign. (Author)
AD-657 049 Not available from CFSTI.

PHYSICAL ACOUSTICS,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 20A.
AD-657 100 Not available from CFSTI.

STUDY OF NUCLEAR SEEDED MHD PLASMAS.
Yearly summary technical rept. no. 2, 1 May 66-30 Apr 67,
Florida Univ Gainesville Dept of Nuclear Engineering Sciences
William H. Ellis. 1 Jun 67, 199p
Contract Nonr-580 (18)

Descriptors: (*Magnetohydrodynamic generators, Plasma physics), (*Reactor coolants, Gas ionization), (*Plasma medium, *Helium), Carbon dioxide, Relaxation time, Numerical analysis, Magnetohydrodynamics, Microwaves, Recombination reactions.
Identifiers: Plasma diagnostics.

The characteristics of a nuclear seeded plasma for use in a MHD generator are being investigated in four separate areas. In the first, the analytic description of the time-space dependence of a single column of ionization is developed and solved approximately by analytic means. A wide range of dimensionless analytic solutions are presented. In the second area, a numerical approach to the column ionization is developed. The objective is to bypass some of the necessary analytic approximations. In the third area, detailed measurements of the buildup, equilibrium and decay of a helium plasma using neutrons were carried out and are reported for various pressures and He3-CO2 combinations. Finally, an engineering survey calculation was carried out to establish the range of nuclear reactor and engineering parameters appropriate to such a MHD system. (Author)
AD-657 199 HC$3.00 MF$0.65

THE TRAIL OF AN IONOSPHERIC SATELLITE, II,
New York Univ N Y
Roberto Vaglio-Laurin, and Y. S. Pan. 1967, 18p
AFOSR-67-1937
Grant AF-AFOSR-818-65
Availability: Published in Rarefied Gas Dynamics, 5th Symposium v2 p1688-1702 1967.

Descriptors: (*Satellites (Artificial), *Ionization trails), Ionosphere, Flight, Magnetic fields, Ions, Velocity, Equations, Partial differential equations, Kinetic theory.

In a companion paper an analytic investigation of the problem from a kinetic point of view is undertaken; perturbations of the neutral and ion gas in the far trail are determined taking into account the effects of the geomagnetic field and of interparticle collisions while representing the body as a point source. In the present paper the analysis is extended to recognize the interplay between length scales associated with properties of the medium (i.e. ion Larmor radius, mean free path) and the scale determined by finite body dimensions; in addition, a first approximation for the self-induced electric field in the far trail is determined. The sequential approach to the analysis is discussed and justified; also a qualitative comparison with other investigations of the title problem is instituted. (Author)
AD-657 246 Not available from CFSTI.

THE SUPER-ALFVENIC NATURE OF SEARS-RESLER FLOW,
Cornell Univ Ithaca N Y
G. S. S. Ludford, and D. W. Yannitell. 22 Aug 66, 21p
AROD-5329:6
Contract DA-31-124-ARO (D)-325
Availability: Published in Journal de Mecanique v6 n2 p153-70 Jun 1967.

Descriptors: (*Airfoils, *Magnetohydrodynamics), Potential theory, Equations of motion, Boundary layer, Acceleration.
Identifiers: Sears-Resler flow.

The paper treats the super-Alfvenic counterpart of the transient, sub-Alfvenic, aligned-fields flow past an airfoil considered by Leibovich and Ludford. No slug regions are formed. In the neighborhood of the airfoil Sears-Resler potential flow is established within a finite time, except for an ultimately vanishing disturbance induced by wave clusters which are shed downstream. The only new difficulty is showing that these wave clusters do not collide. But the replacement of a smooth acceleration, even through the Alfven speed, by an impulsive start is also justified. (Author)
AD-657 280 Not available from CFSTI.

TEST-PARTICLE RELAXATION IN AN ELECTRON GAS DESCRIBED BY THE FOKKER-PLANCK KINETIC EQUATION,
Michigan Univ Ann Arbor Dept of Aerospace Engineering
For primary bibliographic entry see Field 20H.
AD-657 290 Not available from CFSTI.

A MICROWAVE SYSTEM FOR DETERMINING ELECTRON DENSITY AND COLLISION FREQUENCY IN AN IONIZED GAS,
Naval Ordnance Lab White Oak Md
D. Levine, H. S. Brown, and R. J. Haislmaier. 12 May 66, 22p Rept no. Ballistics Research-174, NOLTR-67-80

Descriptors: (*Plasma sheath, Atmosphere entry), (*Electron density, Plasma medium), (*Electromagnetic waves, Propagation), Interactions, Frequency, Gas ionization, Microwaves, Measurement, Calibration.
Identifiers: Plasma diagnostics.

A method is described by which the electron density and collision frequency of an ionized gas may be measured. The system utilizes the simultaneous transmission of microwave energy at three different frequencies through the slab of ionized gas. Transmission coefficients are determined at the three frequencies and from these the information is derived. The method is particularly adaptable at high values of collision frequency. A computer program for the calibration of the microwave system is contained in the report. (Author)
AD-657 296 HC$3.00 MF$0.65

INTERACTION OF A HIGH CURRENT ELECTRICAL DISCHARGE WITH ITS SELF-INDUCED MAGNETIC FIELD IN THE PRESENCE OF GAS FLOW.
Final rept. 30 Jun 64-30 Jun 66,
Avco Missiles Space and Electronics Group Lowell Mass Avco Space Systems Div
A. C. Malliaris. Jan 67, 199p Rept no. AVSSD-0085-67-RR
ARL-67-0007
Contract AF 33 (657)-11310

Descriptors: (*Plasma accelerators, *Magnetohydrodynamics), (*Electric discharges, *Magnetic fields), Interactions, Gas flow, Acceleration, Tables, Nozzle gas flow.

An electrical discharge is considered between two electrodes arranged axisymmetrically. Discharge currents are used up to 2500 amperes in a steady state and in the presence of a nitrogen flow rate of the order of a few hundred milligrams per second. The main objective is to determine quantitatively the importance of magnetoplasmadynamic effects in the acceleration of plasma. After a brief consideration of the analytical background, several experiments are discussed and the corresponding results are analyzed. It was determined that the self-magnetic field makes a substantial contribution, as high as 60 percent or higher in certain cases, to the acceleration of plasma. The particularly effective mechanism in these experiments seems to be the self-induced compression in the discharge which is also manifested as a cathode tip overpressure. It was determined that the overpressure in question depends strongly on the discharge current, but is drastically reduced in the presence of an externally applied magnetic field. An interesting by-product of pressure measurements at the cathode tip is the determination of the cathode spot radius which was found in the near vicinity of 5 mm with a small but detectable dependence on both the current and the pressure. Further experiments and experimental results are also presented from measurements of the impact pressure, the plasma velocity, and electric current density in the plasma flow. (Author)
AD-657 339 HC$3.00 MF$0.65

AFTERGLOW STUDIES IN NITROGEN,
Minnesota Univ Minneapolis Dept of Electrical Engineering
R. E. Lund, and H. J. Oskam. Jul 67, 194p Rept no. Scientific-1
AFCRL-67-0423
Contract AF 19 (628)-4794

Descriptors: (*Plasma medium, Nitrogen), (*Nitrogen, *Afterglows), Spectra (Visible + ultraviolet), Mass spectrum, Gas discharges, Radiofrequency, Relaxation time, Recombination reactions, Catalysis, Adsorption, Molecular energy levels, Interactions.

The temporal behavior of the N (+), N2 (+), N3 (+) and N4 (+) ions in decaying nitrogen plasmas as well as that of the afterglow light intensity was studied in the pressure range of about 0.1 Torr to 1.7 Torr. The plasma container was a glass cylinder covered by a molybdenum film. An electric quadrupole mass spectrometer was used for the ion density studies while a light spectrometer allowed a determination of the spectral distribution of the afterglow light. The analysis of the light intensity decay curves resulted in a method of measuring the surface catalytic efficiency for the recombination of nitrogen atoms at the plasma boundary. An analysis of the N2 (+) density decay curves at low pressures revealed that these ions are produced in the afterglow by collisions between metastable molecules N2 (x) and N2 (y). These metastable molecules are (1) very ineffectively destroyed at the plasma boundary, (b) produced in the afterglow period by the atomic recombination process and (c) responsible for part of the afterglow light emission. The value of the electron temperature, determined through consideration of the losses of the N (+) ions, varied from 1600K to 4500K in the pressure range studied. Evidence was obtained for afterglow electron heating by ionizing collisions between metastable molecules and by superelastic collisions between electrons and vibrationally excited ground state molecules. (Author)
AD-657 355 HC$3.00 MF$0.65

COHERENT, TUNABLE, CW OSCILLATIONS IN A SMOOTH-BORE MAGNETRON - THE PLASMA MAGNETRON,
Florida Univ Gainesville Electron Devices Lab
For primary bibliographic entry see Field 9A.
AD-657 359 HC$3.00 MF$0.65

KINETIC EQUATION FOR A PLASMA AND ITS APPLICATION TO HIGH-FREQUENCY CONDUCTIVITY.

Technical rept.,
Michigan Univ Ann Arbor Dept of Aerospace Engineering
J. H. M. Fu, R. L. Guernsey, and R. S. B. Ong.
Apr 67, 104p
AFOSR-67-1888
Grants AF-AFOSR-825-65, AF-AFOSR-825-67
Research supported in part by NASA, Grant NsG-220-62.

Descriptors: (*Plasma medium, Kinetic theory), (*Electrical conductance, Plasma medium), Statistical functions, Distribution functions, High frequency.

A kinetic equation for an inhomogeneous and non-isotropic plasma is derived in the plasma limit. The treatment is based on the joint solution of the first two members of the BBKGY hierarchy, and on a linearization procedure about the unperturbed state. The unperturbed distribution functions are unspecified. Furthermore, the unperturbed pair correlation function is eliminated in favor of the unperturbed one-particle distribution function. The resulting kinetic equation is free from Bogolyubov's adiabatic hypothesis; therefore, it is valid for arbitrary frequency. In the limiting case when the frequency under consideration is much higher than the collision-frequency, a general expression for the high-frequency electric conductivity tensor is derived. From this general expression the results for the homogeneous and isotropic case previously derived by Klevans and Wu, as well as the results for the thermodynamic equilibrium case derived by Oberman, Ron, and Dawson can be recovered. (Author)
AD-657 362 HC$3.00 MF$0.65

FLUID MECHANICS RESEARCH.
Final rept.,
Cornell Univ Ithaca N Y Graduate School of Aerospace Engineering
W. R. Sears. 28 Jul 67, 5p
AFOSR-67-1924
Grant AF-AFOSR-399-64

Descriptors: (*Magnetohydrodynamics, Scientific research), (*Gas flow, Flat plate models), Trailing edge, Airfoils, Shock tubes, Theory.

A summary report is given concerning research on (1) theoretical studies of electrohydrodynamic flow, (2) the analysis of a certain class of magnetic shock tube, and (3) viscous flow near the trailing edge of a flat plate and theory of airfoils in magnetohydrodynamics.
AD-657 429 HC$3.00 MF$0.65

REACTOR PHYSICS DIVISION ANNUAL REPORT, JULY 1, 1965 TO JUNE 30, 1966.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 16.
ANL-7210 HC$3.00 MF$0.65

EXPERIMENTAL OBSERVATION OF NON- LINEAR COUPLING BETWEEN SLOW AND FAST WAVES IN A PLASMA WAVEGUIDE.
Royal Inst. of Tech., Stockholm (Sweden). Microwave Dept.
For primary bibliographic entry see Field 20N.
For abstract, see STAR 05 19.
N67-32762 HC$3.00 MF$0.65

MICROWAVE STUDIES OF IONIZATION PHENOMENA IN GASEOUS DISCHARGES FINAL SCIENTIFIC REPORT 1 JAN. 1965 - 31 DEC. 1966.
University Coll., Cork (Ireland). Dept. of Electrical Engineering.
M. C. Sexton. 15 Mar 67, 23p AFOSR-67-1112, AD-652503
Contract AF-EOAR-46-65

Descriptors: *Afterglow, *Argon plasma, *Deionization, *Helium plasma, *Microwave interferometer, Chemical, Decay, Density, Discharge, Electromagnetic, Electron, Gas, Harmonic, Interferometer, Kinetics, Microwave, Multiplier, Time.

For abstract, see STAR 05 19.
N67-32807 HC$3.00 MF$0.65

PLASMAPAUSE AND .DIFFUSION ACROSS FIELD LINES.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
H. G. Mayr. Mar 67, 17p NASA-TM-X-55858, X-621-67-120

Descriptors: *Atmospheric composition, *Diffusion, *Magnetosphere, Atmospheric, Composition, Density, Electron, Hydrogen, Latitude, Oxygen, Temperature.

For abstract, see STAR 05 19.
N67-33010 HC$3.00 MF$0.65

PROPAGATION OF ION WAVES IN A PLASMA FLOW TOWARDS A WALL.
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Laboratori Gas Ionizzati.
A. Cavaliere, F. Engelmann, and A. Sestero. Mar 67, 44p LGI-67-4
Sponsored in Part By Euratom

Descriptors: *Discharge tube, *Ion, *Plasma flow, *Wave propagation, Absorption, Boundary, Discharge, Emission, Equation, Flow, Ionization, Plasma, Propagation, State, Steady, Tube, Wall,
For abstract, see STAR 05 19.
N67-33282 HC$3.00 MF$0.65

AMOUNT OF MATTER EMITTED AS A JET FROM A LASERIRRADIATED PELLET.
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Laboratori Gas Ionizzati.
P. Giupponi, and R. Gratton. Mar 67, 7p LGI-67-7
Sponsored in Part By Euratom

Descriptors: *Jet, *Laser, *Pellet, *Plasma, Expansion, Hypersonic, Irradiation, Matter, Propagation, Target, Wave.

For abstract, see STAR 05 19.
N67-33284 HC$3.00 MF$0.65

RESEARCH AND DEVELOPMENT PROGRAMS QUARTERLY REPORT, JAN. - MAR. 1967.
Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
For primary bibliographic entry see Field 20D.
For abstract, see STAR 05 19.
N67-33361 HC$3.00 MF$0.65

PENNING DISCHARGE IN A STRONGLY INHOMOGENEOUS MAGNETIC MIRROR FIELD.
Royal Inst. of Tech., Stockholm (Sweden). Div. of Electron and Plasma Physics.
N. Hopfgarten, R. B. Johansson, B. Nilsson, and H. Persson. 25 May 67, 9p REPT.-67-11

Descriptors: *Collisionless plasma, *Magnetic field, *Penning discharge, Anisotropy, Collisionless, Discharge, Electric, Electron, Field, Inhomogeneity, Ion, Low pressure, Magnetic, Mirror, Plasma, Velocity, Voltage.

For abstract, see STAR 05 19.
N67-33419 HC$3.00 MF$0.65

DEDUCTION OF REENTRY PLASMA PROPERTIES ABOUT MANNED ORBITAL SPACECRAFT FROM RADIO SIGNAL ATTENUATION DATA.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
For primary bibliographic entry see Field 22C.
For abstract, see STAR 05 19.
N67-33463 HC$3.00 MF$0.65

PLASMA DIFFUSION ACROSS THE MAGNETIC SURFACES OF A TOROIDAL FIELD.
Royal Inst. of Tech., Stockholm (Sweden). Div. of Plasma Physics.
B. Lehnert. 13 Jun 67, 15p REPT.-67-12

Descriptors: *Magnetic field, *Plasma diffusion, *Toroidal plasma, Confinement, Diffusion, Drift, Electric, Field, Gradient, Magnetic, Oscillation, Plasma, Pressure, Surface, Toroid.

For abstract, see STAR 05 19.
N67-33509 HC$3.00 MF$0.65

RESEARCH IN ELECTRON PHYSICS AND PLASMA PHYSICS AT THE ROYAL INSTITUTE OF TECHNOLOGY, STOCKHOLM, SWEDEN.
Royal Inst. of Tech., Stockholm (Sweden).
R. Bostroem, and L. Lindberg. May 67, 42p
REPT.-67-04

Descriptors: *Plasma physics, *Research project, *Sweden, Electric, Electrode, Electron, Field, Gas, Ionization, Magnetic, Magnetosphere, Physics, Plasma, Progress, Project, Research, Space, Spectroscopy.

For abstract, see STAR 05 19.
N67-33636 HC$3.00 MF$0.65

IONIZED-WAKE INVESTIGATION IN HOT-SHOT WIND- TUNNELS.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 19.
N67-33641 HC$3.00 MF$0.65

ON THE ORIGIN OF THE SOLAR SYSTEM.
Royal Inst. of Tech., Stockholm (Sweden). Div. of Plasma Physics.
For primary bibliographic entry see Field 3B.
For abstract, see STAR 05 19.
N67-33894 HC$3.00 MF$0.65

PARTIAL COROTATION OF A MAGNETIZED PLASMA.
Royal Inst. of Tech., Stockholm (Sweden). Div. of Plasma Physics.
For primary bibliographic entry see Field 3A.
For abstract, see STAR 05 19.
N67-33961 HC$3.00 MF$0.65

ELECTRON TEMPERATURE VARIATION INDUCED EFFECTS AND LANDAU DAMPING OF ION ACOUSTIC WAVES,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18A.
For abstract, see NSA 21 16.
ORNL-4079 HC$3.00 MF$0.65

20J. Quantum Theory

PHYSICAL FIELDS IN SPACE-TIME,
Politecnico Di Milano (Italy) Istituto Di Matematica
Bruno Finzi. 1966, 11p Rept no. Pub-441
Availability: Published in Meccanica v1 n1/2 p7-14 1966.

Descriptors: (*Field theory, Reviews), Relativity theory, Electromagnetic fields, Gravity, Mechanical waves, Pions, Photons, Electrons, Protons, Neutrons, Mathematical analysis.
Identifiers: Wave equation.

A general and most efficacious procedure for obtaining the equations that govern a physical field is the variational, according to which the field equations express the conditions that must be verified if an expressive global element which relates to the whole range of variability is to remain stationary. We are dealing therefore with a comparative procedure, reducible in essence to that principle of virtual works which, since Lagrange, mechanics has passed on to science in general. This work expounds in unitary form such a procedure, starting off from the classical mechanical field of continuous systems, passing next to the corresponding relativistic field, and thence to the other relativistic fields of the macrocosm: the electromagnetic and the gravitational. From the same variation principle of Hamilton, formulated in space-time, which governs these relativistic fields of the macrocosm, will be derived the relativistic equations which govern in the mic cosm, according to wave mechanics, the neutral scalar fields of the pi zero mesons, the charged scalar fields of the pi + and the pi- mesons, the neutral vector fields of the photons, the charged vector fields as well as the spinor fields of the electrons, protons and neutrons.
AD-656 852 Not available from CFSTI.

TABLES OF SPHEROIDAL WAVE FUNCTIONS. PART 3. SECOND VOLUME OF OBLATE RADIAL FUNCTIONS OF THE FIRST AND SECOND TYPE,
Naval Research Lab Washington D C
For primary bibliographic entry see Field 12A.
AD-656 898 HC$3.00 MF$0.65

EFFECTIVE INTERACTION OF He3 ATOMS IN DILUTE SOLUTIONS OF He3 IN He4 AT LOW TEMPERATURES,
Illinois Univ Urbana
For primary bibliographic entry see Field 20M.
AD-656 962 Not available from CFSTI.

MAGNETIC CHARGE AND GENERAL RELATIVITY,
Harvard Univ Cambridge Mass Dept of Physics
Tung-Mow Yan. 8 Nov 66, 7p
AFOSR-67-1864
Contract AF 49 (638)-1380
Availability: Published in The Physical Review v155 p1423-7 Mar 25 1967.

Descriptors: (*Magnetic moments, *Relativity theory), Quantum mechanics, Field theory, Gravity, Magnetic fields, Operators (Mathematics).

The compatability of the magnetic charge concept with general relativity is examined, using Schwinger's field theory of magnetic charge and his formulation of the quantized gravitational field. For the case of the combined dynamical system of spin-0 charged fields, the electromagne c field, and the gravitational field, all consistency tests and relativistic invariance are shown to be satisfied. (Author)
AD-657 063 Not available from CFSTI.

CHIRAL DYNAMICS,
Harvard Univ Cambridge Mass
J. Schwinger. 6 Apr 67, 6p
AFOSR-67-1863
Contract AF 49 (638)-1380
Availability: Published in Physics Letters v24B n9 p473-6 May 1 1967.

Descriptors: (*Elementary particles, Interactions), Transformations (Mathematics), Groups (Mathematics), Pions, Nuclear scattering, Decay schemes, Nucleons.

The cumbersome operator techniques and weak interaction orientation of current algebra are replaced by a non-operator method based on strong interaction phenomenology. Some new results include alternative possibilities of pion-pion scattering lengths, and a treatment of rho and Al decay widths that supports the interpretation of Al as the axial partner of rho. (Author)
AD-657 094 Not available from CFSTI.

EQUATIONS WITH CONNECTED KERNELS FOR N-PARTICLE T OPERATORS,
Indiana Univ Bloomington
Roger G. Newton. 2 Sep 66, 8p
AROD-5992:4
Grant DA-ARO (D)-31-124-G766
Availability: Published in Journal of Mathematical Physics v8 n4 p851-6 Apr 1967.

Descriptors: (*Nuclear scattering, Operators (Mathematics)), Elementary particles, Interactions, Matrix algebra, Green's function, Diagrams.
Identifiers: T-matrix.

The Lippmann-Schwinger procedure for single particle scattering is generalized for the calculation of n-particle T matrices describing collisions of a particle with a bound state of (n - 1) other particles. The relevant T operators are expressed in terms of resolvents of compact operators, the equations for which are uncoupled. The two-body interactions appear in the form of their T operators only. (Author)
AD-657 267 Not available from CFSTI.

INTRODUZIONE ALLA MECCANICA QUANTISTICA (An Introduction to Quantum Mechanics),
Politecnico Di Milano (Italy) Istituto Di Matematica
Enzo Tonti. 1965, 14p Rept no. Pub-410
Text in Italian.
Availability: Published in Industria Italiana Elettrotecnica ed Elettronica n10 p728-38 1965.

Descriptors: (*Quantum mechanics, Reviews).
AD-657 391 Not available from CFSTI.

0 (5) POLYNOMIAL BASES,
Illinois Univ Urbana Dept of Physics
R. T. Sharp, and S. C. Pieper. 1967, 20p
Contract N00014-67-A-0305-0005
Availability: Published in J. Math. Phys nd np.

Descriptors: (*Elementary particles, *Groups (Mathematics)), (*Polynomials, Groups (Mathematics)), Matrix algebra, Operators (Mathematics), Nuclear spins, Vector spaces.
Identifiers: Symmetry groups.

Polynomial bases are derived for the irreducible representations of the group 0 (5). The trix elements of the infinitesimal generators are given. (Author)
AD-657 399 Not available from CFSTI.

GENERALIZED TRANSFORMATION TO A ROTATING COORDINATE SYSTEM IN QUANTUM MECHANICS.
Doctoral thesis,
Massachusetts Inst of Tech Cambridge National Magnet Lab
H. C. Praddaude. 14 Nov 66, 6p
AFOSR-67-1946
Contract F44620-67-C-0047
Availability: Published in The Physical Review v157 n2 p291-4 May 10 1967.

Descriptors: (*Quantum chanics, *Equations of motion), Nuclear resonance, Nuclear spins, Perturbation theory, Transformations (Mathematics).

A generalized transformation to a rotating coordinate system for the quantum-mechanical equation of motion for the density matrix is presented. The transformation is of value when the time dependence of the perturbation is harmonic in time and contains resonant and nonresonant terms. It is shown that after the transformation, the resonant terms are slowly varying in time and are mostly responsible for the phys al behavior of the system in the neighborhood of the resonance. The nonresonant terms give a small contribution and have a rapidly varying phase. A formal procedure is given which yields an equation containing only the low-frequency part of interest. A general result of this transformation is the appearance of the Bloch-Siegert shift of the resonance frequency due to the influence of the nonresonant terms. As an example, a straight-forward application of the method is carried out in order to compute the Bloch-Siegert shift of the resonance for a spin-1/2 system. (Author)
AD-657 531 Not available from CFSTI.

EFFECTIVE HAMILTONIANS FOR BLOCH ELECTRONS IN A MAGNETIC FIELD.
Technical rept.,
Oregon Univ Eugene Dept of Physics
Robert J. Hardy. Jul 67, 98p Rept no. TR-12
Contract Nonr-2771 (05)

Descriptors :(*Hamiltonian, *Band theory of solids), Perturbation theory, Magnetic fields, Transformations (Mathematics), Operators (Mathematics), Matrix algebra, Electrons, ve functions, Quantum mechanics.
Identifiers: Eigenvalues, Schrodinger equation, Bloc helectrons.

It is shown for electrons in a periodic potential and a uniform magnetic field that there exists a Hermitian 'mixed-band' effective Hamiltonian of the form W sub alpha, gamma (p-eA/c), where p is the momentum and A is the vector potential. The off-diagonal elements in W sub alpha, gamma make it possible to describe interband effects such as magnetic breakdown. An orthogonal set of basic functions relates the effective Hamiltonian to the equivalent one-electron configuration-space Hamiltonian. Spine effects are neglected. The above statements are verified both in general by using the group properties of the magnetic translation operator and by expanding in powers of the magnetic field strength. The latter approach is necessary for relating the function W sub alpha, gamma (k) used in constructing the effective Hamiltonian to the electronic band structure.
AD-657 533 HC$3.00 MF$0.65

EARTH EXPANSION GENERAL RELATIVITY PROBLEMS OF ABSTRACT ALGEBRA FINAL REPORT.
Hamburg Univ. (West Germany).
P. Jordan. 1967, 61p ARL-67-0122, AD-653981
Contract AF 61/052/-567

Descriptors: *Algebra, *Dirac equation, *Gravitational field, *Relativity theory, Abstra f, Earth, Equation, Expansion, Field, General, Gravitational, Hypothesis, Mathematics, Motion, Problem, Relativity, Theory.

For abstract, see STAR 05 19.
N67-33686 HC$3.00 MF$0.65

20K. Solid Mechanics

DIRECT NUMERICAL DETERMINATION OF THE STRESS FIELD IN A THIN ELASTIC DISK,
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
William Prager. 1967, 14p
AROD-5133:58-P
Contract DA-31-124-ARO (D)-257, ARPA Order-0570
Availability: Published in Journal of Applied Mathematics and Physics (ZAMP) v18 n3 p301-11 1967.

Descriptors: (*Stresses, Disks), Numerical analysis, Difference equations, Elasticity, Strain (Mechanics), Boundary value problems, Mechanical properties.

In this paper, an analogous method of establishing finite difference equations for the stress field in a thin elastic disk is described, which uses a square grid with both sets of diagonals and localized fields of piecewise constant self-stress with continuous traction across any common side of adjacent triangles. Both the static method presented in this paper and the customary kinematic method based on a continuous, piecewise linear displacement field yield systems of linear equations that are exactly

satisfied when the boundary conditions correspond to a linear displacement field or a constant stress field. Before the efficiencies of the methods can be compared for less simple boundary conditions, it will be necessary to gain numerical experience with the static method. This comparison will therefore be left to a subsequent paper. (Author)
AD-656 794 Not available from CFSTI.

A RELAXATION PROCEDURE FOR COMPUTING STRESSES IN BUILT-UP STRUCTURES.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
E. C. Capey. Mar 67, 43p Rept no. RAE-TR-67062

Descriptors: (*Stresses, Structural properties), (*Boundary value problems, Structural properties), Flat plate models, Thermal stresses, Convergence, Iterative methods, Computer programs.

A method is presented for computing the stress distribution in a thin-walled structure by dividing the structure into finite elements, setting up plane stress equations for each element and solving these by an iterative procedure. Its merits are simplicity of application and economy of computer storage space and operation time. The method is applied to a simple plane stress problem and to a built-up structure. Its accuracy is tested by comparing results obtained for the plane stress problem with the known closed form solution, and by comparing together results obtained for the built-up structure using different element sizes. (Author)
AD-656 871 HC$3.00 MF$0.65

THERMAL STRESSES IN FINITE LENGTH SANDWICH CYLINDERS.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Robert M. Rivello. Mar 67, 48p Rept no. TG-903
Contract NOw-62-0604

Descriptors: (*Thermal stresses, Cylindrical bodies), Sandwich construction, Boundary value problems, Computer programs, Predictions, Flow charting, Mathematical analysis.

A method was developed for computing the thermal stresses in a finite length sandwich cylinder with thin faces and an isotropic core. The theory, which includes the effects of longitudinal, radial, and shear rigidity of the core, treats the faces as membranes and assumes that the longitudinal and radial displacements in the core vary linearly between the face displacements. The governing equations are derived by the variational method of using the stationary value of the total potential. These equations are solved by the finite-difference method. The analysis has been programmed for the IBM 7094 computer. A brief outline of the program is given, and the input and output formats are described. The results of three check problems are given. These results indicate that the program gives reliable results for a wide range of radii and core moduli. The results of a limited parameter study to determine the effects that length, radius, and core modulus have upon the thermal stresses are given and discussed. (Author)
AD-656 887 HC$3.00 MF$0.65

A NOTE ON CAUCHY'S THEOREM,
Carnegie Inst of Tech Pittsburgh Pa Dept of Mathematics
For primary bibliographic entry see Field 12A.
AD-656 923 HC$3.00 MF$0.65

DYNAMICS AND THERMODYNAMICS OF VISCOELASTIC MEDIA.
North Carolina State Univ Raleigh
For primary bibliographic entry see Field 20M.
AD-656 943 HC$3.00 MF$0.65

ON UNIQUENESS IN GENERAL LINEAR VISCOELASTICITY.
Revised ed.,
California Univ Berkeley
J. Lubliner, and J. L. Sackman. 8 Jul 66, 13p
AROD-4547:26
Contract DA-31-124-ARO (D)-460
Revision of manuscript submitted 4 Apr 66.
Availability: Published in Quarterly of Applied Mathematics, v25 n2 p129-38 Jul 1967.

Descriptors: (*Viscoelasticity, Mathematical analysis), Elasticity, Theorems, Boundary value problems, Stresses, Strain (Mechanics), Mechanical properties.
Identifiers: Uniqueness theorem.

On the basis of two theorems pertaining to the asymptotic behavior of certain Laplace transforms, the uniqueness of the displacement field in a general linear viscoelastic body (i.e., one with time-variable properties) throughout a time interval is demonstrated, provided the instantaneous elasticity tensor (or, in the case of a generalized Kelvin-Voigt material, the instantaneous viscosity tensor) is positive definite and a continuous function of time, and provided the following information is specified: the displacement field, to within a rigid-body motion, throughout the body and at all times before the given interval; the displacement and velocity fields throughout the body at the beginning of the interval (initial conditions); the body force throughout the body and throughout the interval; and, at each point of the boundary, in each of three orthogonal directions, a component of the traction or of the displacement throughout the time interval. If inertia is neglected, the initial conditions may be dispensed with, but the displacement field is unique only to within a rigid-body motion. (Author)
AD-656 956 Not available from CFSTI.

A CALCULATION OF THE COHESIVE ENERGY AND ELASTIC CONSTANTS OF MgO,
Uppsala Univ (Sweden) Inst of Physics
J. L. Calais, K. Mansikka, G. Pettersson, and J. Vallin. 21 Apr 67, 10p
AFOSR-67-1835
Contract AF 61 (052)-937
Availability: Published in Arkiv fuer Fysik v34 n29 p361-6 1967.

Descriptors: (*Magnesium oxides, Mechanical properties), Wave functions, Molecular association, Quantum mechanics, Elasticity, Compressive properties, Crystal structure.
Identifiers: Elastic constants, Ionic crystals, Cohesion.

The cohesive energy, the compressibility and the elastic constants of MgO have been calculated with the method developed by Lowdin. Both Mg+|---O---O---interactions are taken into account. The latter ones are found to be quite important. (Author)
AD-656 981 Not available from CFSTI.

THE BRITTLE STRENGTH OF ORTHOTROPIC MATERIALS,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
Oscar Hoffman. 12 Aug 66, 10p
Availability: Published in Journal of Composite Materials v1 n2 p200-6 Apr 1967.

Descriptors: (*Brittleness, *Fracture (Mechanics)), Composite materials, Sheets, Tensile properties, Compressive properties, Reinforcing materials, Fibers.

A phenomenological fracture condition is proposed for orthotropic brittle materials. It contains nine material parameters and can account for widely differing compressive and tensile strengths in various directions. The proposed fracture condition is developed, purely on formal grounds, by borrowing features of the Mises-Schleicher isotropic yield condition and Hill's orthotropic yield condition. Comparison with experimental data on a fiber-reinforced composite material shows good agreement. The reader is reminded repeatedly that, despite formal similarities, yield conditions and brittle-fracture conditions pertain to unrelated physical phenomena. (Author)
AD-657 078 Not available from CFSTI.

OPTIMUM THICKNESS TRANSITIONS FOR CYLINDRICAL PRESSURE VESSELS WITH HEMISPHERICAL HEADS.
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
For primary bibliographic entry see Field 13D.
AD-657 080 Not available from CFSTI.

GENERAL INSTABILITY OF CYLINDRICAL SHELLS WITH NON-UNIFORM STIFFENERS,
Technion - Israel Inst of Tech Haifa
Ovadia Harari, Josef Singer, and Menahem Baruch. 21 Dec 66, 18p
AFOSR-67-1929
Contract AF 61 (052)-905
Availability: Published in Israel Journal of Technology v5 n1/2 p114-28 1967.

Descriptors: (*Stiffened cylinders, Structural properties), (*Structural shells, Stability), Optimization, Reinforcing materials, Rings, Loading (Mechanics), Weight, Hydrostatic pressure, Israel.

The work is a step towards optimization of stiffened cylindrical sheels. Rings and stringers of non-uniform cross-section are analysed as means of obtaining higher structural efficiencies. For lateral pressure loading rings with non-uniform height or width are compared. The gain in general instability pressure relative to the uniformly stiffened shell of the same weight amounts to 70%-80%. For prescribed loading, 10-20% weight savings are obtained. For axially compressed cylinders stringers with sinusoidal and linear height variation are studied and compared. Gains in load and weight savings of 30% and 10%, respectively, are obtained, and the sinusoidal variation is found to be superior to the linear variation. Finally cylinders under hydrostatic pressure stiffened by a combination of uniform stringers and non-uniform rings are analysed. Different configurations are checked in order to obtain the highest possible efficiencies. (Author)
AD-657 089 Not available from CFSTI.

RESPONSE OF A RIGID-PLASTIC RING TO IMPULSE LOADING,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
G. B. Cline, and W. E. Jahsman. 1966, 8p
Contract AF 04 (694)-655
Prepared for presentation at the National Congress of Applied Mechanics (5th), Minneapolis, Minn., June 14-17 1966.
Availability: Published in Journal of Applied Mechanics 329-36 Jun 1967.

Descriptors: (*Rings, *Loading (Mechanics)), Plasticity, Impact shock, Stresses, Deformation, Mathematical analysis.

Formulas are derived which describe the dynamic response of a ring of rigid-plastic material which is subjected to an arbitrarily distributed impulse load. When the impulse is distributed over half the ring in a cosine fashion, the final deformation is proportional to the square of the maximum magnitude of the applied impulse. Although the predominant deformation is in a bending or 'ovaling' mode, one half of the incident energy is dissipated in the 'membrane' or direct stress mode. The remainder is divided equally between bending (plast work at the hinges) and kinetic energy. (Author)
AD-657 096 Not available from CFSTI.

STRUCTURAL EFFICIENCY OF VARIOUS MATERIALS AT ELEVATED TEMPERATURES,

Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 11F.
AD-657 110 HC$3.00 MF$0.65

THE PHILOSOPHY OF VIBRATION TESTING,
American Chain and Cable Co Inc Detroit Mich
Robert L. Stallard. 1 Jun 56, 20p Rept no. CF-2516
Contract NOrd-7386

Descriptors: (*Vibration, Test methods), Mathematical analysis, Stochastic processes, Analysis, Environmental tests, Quality control, Resonance, Performance (Engineering).

Most vibration encountered in the various transportation vehicles such as aircraft, guided missiles, trucks, etc. is a stochastic function and bears no resemblance to a sine wave. Therefore, to conduct a realistic vibration test for the acceptance of a component, a multi-frequency forcing function should be used to drive the shaker. However, for design modification purposes a sine wave vibration test is more useful. This paper provides the engineer with a guide towards proper vibration analysis and a method of using the results of this analysis to specify an adequate vibration test. (Author).
AD-657 111 $3.00 MF$0.65

INFLUENCE OF STRAIN HARDENING AND STRAIN-RATE SENSITIVITY ON THE PERMANENT DEFORMATION OF IMPULSIVELY LOADED RIGID-PLASTIC BEAMS,
Brown Univ Providence R I Div of Engineering
For primary bibliographic entry see Field 13M.
AD-657 129 HC$3.00 $0.65

EXPERIMENTAL STUDIES OF DAMPING IN ELASTIC BARS BY LATERAL SURFACE TREATMENT,
Texas Univ Austin Defense Researc hLab
E. A. Ripperger. 28 Jun 56, 15p Rept no. DRL-374
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab., CF-2484.

Descriptors: (*Vibration, *Damping), Viscoelasticity, Coatings, Rods, Compressive properties, Surface properties, Steel, Mechanical waves.

The energy-dissipating characteristics of various types of lateral surface treatments on a cylindrical steel bar were investigated by observing the reduction in amplitude of compressional pulses propagated through the treated part of the bar. Typical results are presented for 15 different damping arrangements. These results indicate that the most effective damping is obtained by coating the bar with a visco-elastic material of high density. (Author)
AD-657 132 HC$3.00 MF$0.65

PRELIMINARY STUDIES ON EFFECTS OF INTERNAL DAMPING ON THE VIBRATION AND WAVE PROPAGATION PROPERTIES OF ELASTIC RODS,
Texas Univ Austin Defense Research Lab
H. J. Plass, Jr. 24 Feb 56, 13p Rept no. DRL-371
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab. CF-2481.

Descriptors: (*Vibration, Rods), (*Rods, Mechanical properties), Elasticity, Internal friction, Models (Simulations), Mathematical analysis, Loading (Mechanics), Force (Mechanics), Mechanical waves, Stresses, Strain (Mechanics).

A short study is made to determine the extent to which internal damping of metals can be relied upon to reduce vibration. Three models are discussed in the report.
AD-657 136 HC$3.00 MF$0.65

EXPERIMENTAL STUDIES ON VIBRATION CHARACTERISTICS OF SOME IDEALIZED MISSILE FINS,
Texas Univ Austin Defense Research Lab
J. W. Dalley. 11 Sep 57, 39p Rept no. DRL-402
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab. CF-2643.

Descriptors: (*Vibration, Guided missile components), Oscillation, Metal plates, Loading (Mechanics), Performance (Engineering), Test facilities.

This report describes a method of exciting missile fins and of determining some of their lowest natural frequencies and corresponding mode shapes. Three model configurations were tested: a constant thickness square plate, a constant thickness trapezoidal plate, and a square planform, double-wedge plate. All the plates tested were free at all edges except the root which was restrained at the quarter chord by a shear pin, and at the midchord by a rotatable shaft with its axis in the spanwise direction. Numerical values for the lowest three frequencies and photographs of the node lines for the corresponding modes are presented for the two constant thickness plates. Some difficulties were encountered which invalidated the test results for the double-wedge plate. Some photographs of the edges of the two constant thickness plates taken while the plates were vibrating are also presented. These photographs were taken with the aid of a stroboscope, and show the edge of the test plate at its two extremes of travel, thus showing the mode shape of the plate edge. Both the natural frequency and mode shape of the plates were found to be quite sensitive to the amount of restraint provided by the shear pin at the root quarter chord. (Author)
AD-657 138 HC$3.00 MF$0.65

SANDWICH PLATES HAVING DISSIPATIVE CORES, AS VIBRATION ENERGY ABSORBERS,
Texas Univ Austin Defense Research Lab
H. J. Plass, Jr. 15 Jul 56, 22p Rept no. DRL-385
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab., CF-2542.

Descriptors: (*Vibration, Absorption), Metal plates, Viscoelasticity, Damping, Elasticity, Stresses, Sandwich construction, Strain (Mechanics), Electrical equipment, Guided missiles, Mathematical analysis.

The electronic equipment in a guided missile during flight is subjected to vibrations carried from the propulsion unit through the frame to the deck on which the equipment is mounted. It is desirable to keep the amplitude of these vibrations in the sensitive electronic units as low as possible. To accomplish this, vibration absorbers may be incorporated between the frame of the missile and the equipment deck, or the deck itself may be constructed so that it acts as a continuous vibration absorber. Such a deck may be made in the form of a sandwich plate, that is, a composite plate-like structure having two thin metal faces separated by a thicker core of some material which has dissipative properties. In this report two types of sandwich plates having visco-elastic cores and one type of dry friction sandwich are studied. Some comparisons are made on the damping effectiveness of each kind of sandwich plate studied.
AD-657 140 HC$3.00 MF$0.65

A STUDY OF DAMPING EFFECTS ARISING FROM EXTERNAL COATING OF VISCO-ELASTIC MATERIALS ON METAL BARS,
Texas Univ Austin Defense Research Lab
H. J. Plass, Jr. 6 Jul 56, 20p Rept no. DRL-375
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab., CF-2485.

Descriptors: (*Vibration, *Damping), Stresses, Rods, Coatings, Viscoelasticity, Performance (Engineering), Strain (Mechanics), Mathematical analysis.

In a previous report (AD-657 136), a short study was made to determine the extent to which internal damping of metals could be relied upon to reduce vibration. It was found that for ordinary temperatures this effect is almost negligible. In this report a study is made of the damping effectiveness of external coatings on bars, the coatings being made of some visco-elastic material such as tar or plastic tape. It is possible that the motions induced in the coatings by the corresponding motions in the rod or beam may, by virtue of the viscosity of the coating material, reduce undesired vibrational energy to an acceptable level. There is the additional problem, however, that too much coating material may be needed to provide sufficient damping. In such cases, undesirability large increases in weight may result. In the following brief study coated metal bars are studied theoretically over a rather wide range of assumed values of coating viscosity and coating thickness, and wave length of vibrational disturbance. (Author)
AD-657 141 HC$3.00 MF$0.65

THE VALIDITY OF THE SINGLE DEGREE OF FREEDOM SYSTEM ANALOG FOR VIBRATION ANALYSIS,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Robert L. Stallard. May 56, 27p Rept no. CF-2518
Contract NOrd-7386

Descriptors: (*Vibration, Analysis), (*Test equipment (Electronics), Vibration), Stochastic processes, Wiring diagrams, Mechanical properties, Models (Simulations), Mathematical analysis, Performance (Engineering).

A series of electrical analogs, each of which had the properties of a mechanical single degree of freedom system at a given frequency with control over 'Q' were designed and constructed at APL for the purpose of vibration analysis. This report presents test results showing the degree of accuracy that may be obtained from these analogs using the analysis techniques outlined. It was initially assumed that the flight vibration was a stochastic function.
AD-657 142 HC$3.00 MF$0.65

THE GENERATION OF THERMOELASTIC STRESS WAVES BY IMPULSIVE ELECTROMAGNETIC RADIATION.
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
For primary bibliographic entry see Field 20N.
AD-657 181 HC$3.00 MF$0.65

ROLE OF DIFFUSION IN CREEP AND STRESS-RUPTURE IN SOLIDS.
Final rept.,
Stanford Univ Calif Dept of Materials Science
Oleg D. Sherby, and John C. Shyne. 1 Aug 67, 22p Rept no. SU-DMS-67-35
Contract Nonr-225 (60)

Descriptors: (*Creep, *Diffusion), (*Rupture, Stresses), Metals, Grain size, Deformation, High-temperature research, Solid solutions, Dislocations, Composite materials, Alloys, Energy, Elasticity, Ductility, Solids.

The subject matter of the report relates to the mechanical behavior of polycrystalline solids at elevated temperature and the results obtained are described under four separate headings, namely: (A) Grain size effects on creep behavior, (B) Stacking fault energy effects on creep behavior, (C) Influence of second hard phase on mechanical behavior and (D) Modes of deformation in high temperature creep. (Author)
AD-657 197 HC$3.00 MF$0.65

ON THE STRESSES NEAR A CRACK IN AN ELASTIC SHEET.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
E. H. Mansfield. Jan 67, 25p Rept no. RAE-TR-67030

Descriptors: (*Cracks, Stresses), Elasticity, Geometric forms, Loading (Mechanics), Modulus of elasticity, Mathematical analysis, Great Britain.

The report considers the (two-dimensional) stresses near a crack in an infinite elastic sheet under uniform all-round tension. The analysis differs from classical theory in that account is taken of the varying shape of the crack. It is shown that in the vicinity of the tips of the crack the stresses increase non-linearly with the applied load; these stresses also depend on the magnitude of Young's modulus itself. (Author)
AD-657 203 HC$3.00 MF$0.65

IMPULSIVELY LOADED STRAIN-RATE-SENSITIVE PLATES.
Revised ed.,
Catholic Univ of America Washington D C
Nicholas Perrone. 15 Jul 67, 5p
Research supported in part by Office of Naval Research, Washington, D. C., and NSF. Revision of manuscript submitted 13 Jun 66.
Availability: Published in Journal of Applied Mechanics p380-4 Jun 1967.

Descriptors: (*Structural parts, Loading (Mechanics)), Strain (Mechanics), Numerical analysis, Plasticity, Kinetic energy.
Identifiers: Plates (Mechanical).

The response of an impulsively loaded, isotropically rate-sensitive annular plate is calculated via 'exact' and approximate viewpoints. For a typical example, numerical results differed by about 3 percent. The essence of the approximate approach, which represents a natural extension of a previous one-dimensional analysis, is that the initial stress profile remains substantially constant during the dominant portion of plastic flow. (Author)
AD-657 221 Not available from CFSTI.

ONE-DIMENSIONAL ATOMIC MODEL FOR A DISLOCATION LINE,
Columbia Univ New York Dept of Mechanical Engineering
For primary bibliographic entry see Field 20B.
AD-657 244 Not available from CFSTI.

DYNAMIC BUCKLING OF A CIRCULAR RING CONSTRAINED IN A RIGID CIRCULAR SURFACE,
Massachusetts Inst of Tech Cambridge Dept of Aeronautics and Astronautics
T. H. H. Pian, H. A. Balmer, and L. L. Bucciarelli, Jr. 1965, 16p
AFOSR-67-1945
Contract AF 33 (615)-1943, Grant AF-AFOSR-347-64
Prepared for presentation at the International Conference held at Northwestern Univ., Evanston, Ill., October 18-20 1965.
Availability: Published in Dynamic Stability of Structures p285-97 1966.

Descriptors: (*Rings, *Buckling (Mechanics)), Dynamics, Numerical analysis, Loading (Mechanics).

The paper is concerned with an extension of the general method to the study of dynamic buckling of a ring which is constrained in a rigid circular surface and is subjected to a transiently applied inertial loading. In this case a relationship accounting for the collision between the ring and the rigid boundary is required. (Author)
AD-657 253 Not available from CFSTI.

SHOCK DAMAGE MECHANISM OF A SIMPLE STRUCTURE,
David Taylor Model Basin Washington D C Structural Mechanics Lab
L. T. Butt, R. D. Short, Jr., and E. A. Thornton. Mar 67, 61p
DTMB-2191

Descriptors: (*Cantilever beams, Impact shock), Deformation, Creep, Damage, Shock resistance, Elasticity, Plasticity, Explosion effects, Structures.

Two sets of four cantilever beams loaded with tip masses were mounted on a floating shock platform and shock tested by underwater explosions. These simple mechanical models were designed to undergo appreciable plastic deformations. Three analytical approaches to predict shock damage were applied to these beam - mass models: one considering elastic - perfectly plastic mode response; another considering an energy balance to predict displacement bounds; and the third considering an inelastic deformation mode approximation. The displacement bound and mode approximation methods were applied considering both elastic - perfectly plastic and rigid - perfectly plastic deformations. The analytical results were compared with experimental data. The elastic - perfectly plastic analysis shows good agreement with experiment up to the initial peak displacement. Computed elastic - plastic bounds and inelastic mode approximations also provide good estimations of the initial displacements. (Author)
AD-657 298 HC$3.00 MF$0.65

MECHANICAL BEHAVIOR OF BERYLLIUM WIRE REINFORCED PLASTIC COMPOSITES. PART I. STATIC MECHANICAL PROPERTIES.
Air Force Materials Lab Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 11I.
AD-657 309 HC$3.00 MF$0.65

A MANIFOLD OF PERIODIC ORBITS,
Boeing Scientific Research Labs Seattle Wash Mathematics Research Lab
Andre Deprit, and Jacques Henrard. Jun 67, 214p Rept no. D1-82-0622, Mathematical note-515

Descriptors: (*N-body problem, *Orbital trajectories), Periodic variations, Motion, Stability, Dynamics, Mathematical analysis.

In the restricted problem of three bodies, when the mass ratio is such that the characteristic exponents at L sub 4 are equal in pair, the triangular equilibrium is a point of ramification in the analytical manifold of periodic orbits emanating from L sub 4: the branch L sub 4 superscript s of short period orbits can be continued through L sub 4 by the branch L sub 4 superscript l of long period orbits, and this real analytical continuation is unique. The branch L sub 4 superscript l ends with an orbit traveled twice which is an element of L sub 4 superscript s. The branch L sub 4 superscript s meets its mirror image L sub 5 superscript s of short period orbits around L sub 5 on a symmetric orbit which is also an element of the branch L sub 3 of periodic solutions emanating from the collinear equilibrium L sub 3. Around L sub 4, the branches L sub 4 superscript l and L sub 4 superscript s are connected by bridges B (pL,qS) of periodic orbits which start from a long period orbit traveled p times and end with a short period one traveled q times. We have completely explored the bridges B (2L,3S), B (3L,4S) and B (4L,5S). (Author)
AD-657 341 HC$3.00 MF$0.65

FRACTOGRAPHIC STUDIES WITH A LINEAR POLYMER WITH SPECIAL CONSIDERATION OF FATIGUE FRACTURE.
Technical rept.,
Columbia Univ New York Inst for the Study of Fatigue and Reliability
G. Jacoby, and C. Cramer. Apr 67, 126p Rept no. TR-47
Contract Nonr-266 (91)

Descriptors: (*Polyester plastics, Fractography), (*Fracture (Mechanics), Polyester plastics), Fatigue (Mechanics), Polymers, Crack propagation, Surfaces, Linear systems.
Identifiers: Bisphenol-A polycarbonate.

The observation of fatigue striations on fatigue fracture surfaces of a linear polymer lead to a study of the fatigue fracture mechanism in this material. In order to understand the fatigue fracture the discussion had to be extended to include static tensile fracture, creep fracture and impact fracture. Interest has been concentrated on the appearance of the respective fracture surfaces as a possible clue to the different fracture mechanism because these surfaces reflect the processes involved in the fracture of solids. On the same basis the similarity between fracture phenomena in metals and in polymers is emphasized throughout the paper. The present study has lead to the formulation of a hypothesis for the fatigue mechanism in a linear polymer and of an analytical crack propagation law. (Author)
AD-657 373 HC$3.00 MF$0.65

BOUND ON STRESSES CAUSED IN SANDWICH ARCHES BY BOUNDED ANELASTIC STRAINS.
Technical rept.,
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
Jenn-Ming Chern, and S. Nemat-Nasser. Aug 67, 28p Rept no. TR-12
Contract N00014-67-A-0109-0003

Descriptors: (*Sandwich construction, Stresses), (*Structural parts, Stresses), Strain (Mechanics), Bending, Moments, Shear stresses, Force (Mechanics), Distribution.
Identifiers: Arches (Structures).

Bounds are obtained on the bending moments and the resultant thrusts and shear forces that can be induced in a section of a sandwich arch by anelastic strains of unknown distributions but bounded magnitudes. The example of a parabolic sandwich arch is worked out in detail to illustrate the results. (Author)
AD-657 377 HC$3.00 MF$0.65

APPLICATION OF THE SMOOTH-SURFACE INTERPOLATION TO THE FINITE-ELEMENT ANALYSIS,
Massachusetts Inst of Tech Cambridge
A. L. Deak, and T. H. H. Pian. 19 Aug 66, 4p
AFOSR-67-1899
Grants AF-AFOSR-347-64, AF-AFOSR-347-65
Availability: Published in AIAA Journal v5 n1 p187-9 Jan 1967.

Descriptors: (*Metal plates, Bending), (*Interpolation, Compatibility), Polynomials, Deflection, Load distribution, Stresses, Surfaces, Vibration, Errors, Predictions.

During the past few years, numerous attempts have been made to derive the element stiffness matrices for plate elements in bending. Many of these matrices do not yield monotonically converging results because the corresponding displacement interpolation functions do not satisfy the compatibility of slopes along the normals of the interelement boundaries. The present note is to show that two schemes for smooth-surface interpolation as suggested by Birkhoff and Garabedian can be incorporated in the finite element displacement analyses using rectangular plate elements. One of these is the relatively simple 12-parameter fully compatible interpolation function, and the other is the idea of applying spline constraint for smooth surface interpolation.
AD-657 403 Not available from CFSTI.

EFFECTIVE STIFFNESS THEORY FOR LAMINATED MEDIA.
Technical rept.,
Northwestern Univ Evanston Ill Structural Mechanics Lab
Chin-teh Sun, Jan D. Achenbach, and George Herrmann. Jul 67, 37p Rept no. TR-67-4
Contract Nonr-1228 (34)

Descriptors: (*Laminates, *Flexural strength), Equations of motion, Dynamics, Elasticity, Shear stresses, Strain (Mechanics), Mechanical properties, Mathematical analysis.

In this report a method is proposed to derive displacement equations of motion for a laminated medium. In deriving the equations the displacements of the reinforcing layers and the matrix layers are expressed as linear expansions about the midplanes of the layers. Dynamic interaction of the layers is included through continuity relations at the interfaces. The strain and kinetic energy densities of the layers are computed, where correction coefficients are introduced to compensate for errors in the strains. By means of a smoothing operation, approximate kinetic and strain energy densities for the laminated medium are obtained, and subsequent application of Hamilton's principle yields the displacement equations of motion. For the case of plane strain the equations are worked out in detail. The features of the new theory are exhibited by studying the propagation of plane free harmonic waves in an unbounded medium. Dispersion curves are shown for transverse and longitudinal motions and comparisons are made with curves obtained by using the equations of the theory of elasticity for all layers. The restrictions of the present theory are discussed, and some attention is devoted to a method of improving the results by including quadratic terms in the displacement expansions. (Author)
AD-657 462 HC$3.00 MF$0.65

VIBRATIONS OF A VISCOELASTIC BODY.
Revised ed.,
Northwestern Univ Evanston Ill
J. D. Achenbach. 5 Dec 66, 2p
Contract Nonr-1228 (34)
Revision of manuscript submitted 23 Nov 66.
Availability: Published in AIAA Journal v5 n6 p1213-4 1967.

Descriptors: (*Viscoelasticity, Materials), Vibration, Equations of motion, Boundary value problems, Dynamics.

It was concluded that for a body of viscoelastic material of constant Poisson's ratio subjected to surface tractions, the dynamic displacement can be obtained, provided that (1) the static boundary-value problem for the corresponding elastic body subjected to the surface tractions can be solved, (2) the normal modes of free vibration of the corresponding elastic body are known, and (3) can be solved for phi sub n (t).
AD-657 495 Not available from CFSTI.

NOTE ON THE PROPAGATION OF ELASTIC WAVES IN A NONHOMOGENEOUS ROD OF FINITE LENGTH.
Revised ed.,
Southwest Research Inst San Antonio Tex Dept of Mechanical Sciences
P. H. Francis. 2 Aug 66, 4p
AFOSR-67-1957
Contract AF 49 (638)-1485
Revision of manuscript submitted 21 Feb 66.
Availability: Published in Journal of Applied Mechanics 2p Mar 1967.

Descriptors: (*Mechanical waves, Propagation), (*Rods, Mechanical waves), Vibration, Boundary value problems, Special functions (Mathematical).
Identifiers: Sturm-Liouville problems.

In taking separate account of temperature and modulus variations for the case of free and forced vibrations of a nonhomogeneous rod of finite length where the modulus varies as the square of the spatial coordinate, it is demonstrated that by accounting for the temperature and modulus effects in the manner described, one is led to a Sturm-Liouville problem involving Legendre's equation. (Author)
AD-657 517 Not available from CFSTI.

INFLUENCE OF IN-PLANE BOUNDARY CONDITIONS ON THE STABILITY OF CONICAL SHELLS UNDER HYDROSTATIC PRESSURE.
Technion - Israel Inst of Tech Haifa
Josef Singer, Menahem Baruch, and Ovadia Harari. 27 Nov 66, 17p
AFOSR-67-1942
Contract AF 61 (052)-905
Availability: Published in Israel Journal of Technology v5 n1 p12-24 1967.

Descriptors: (*Conical bodies, Buckling (Mechanics)), (*Structural shells, Hydrostatic pressure), Stability, Loading (Mechanics), Differential equations, Surface properties, Israel.

The stability of simply supported conical shells under hydrostatic pressure is investigated for 4 different sets of in-plane boundary conditions. The first two stability equations are solved by the assumed displacements, while the third is solved by a Galerkin procedure. The boundary conditions are satisfied with 4 unknown coefficients in the expressions for u and v. As in cylindrical shells, the effect of axial restraint is found to be of primary importance in conical shells under hydrostatic pressure, whereas the circumferential restraint has little influence. The effect depends on the length of the shell, its relative thickness and the cone angle. For large cone angles the influence of the axial restraint decreases and that of the circumferential restraint increases. The results are compared with those obtained earlier and with results of other investigators. (Author)
AD-657 532 Not available from CFSTI.

BASIS OF A WELL CONDITIONED FORCE PROGRAM FOR EQUILIBRIUM MODELS VIA THE SOUTHWELL SLAB ANALOGIES REPORT FOR JUL. 1966 - NOV. 1966.
Liege Univ. (Belgium). Laboratoire D'aeronautique.
B. M. De Veubeke. Mar 67, 29p SA-8, AFFDL-TR-67-10
Contract AF 61/052/-892

Descriptors: *Mathematical model, *Stress function, Algebra, Analysis, Boundary, Dynamics, Force, Function, Loading, Mathematics, Matrix, Mechanics, Model, Slab, Stiffness, Stress, Structural, Structural analysis, Value.

For abstract, see STAR 05 19.
N67-32811 HC$3.00 MF$0.65

STRESSES AT THE TIP OF A LONGITUDINAL CRACK IN A PLATE STRIP.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
W. B. Fichter. Aug 67, 57p NASA-TR-R-265

Descriptors: *Crack, *Stress, *Strip, Bending, Fracture, Mechanics, Plate, Shear, Structural.

For abstract, see STAR 05 19.
N67-32815 HC$3.00 MF$0.65

INTERACTION OF A RING-REINFORCED SHELL AND A FLUID MEDIUM.
Polytechnic Inst. of Brooklyn, N. Y. Dept. of Aerospace Engineering and Applied Mechanics.
J. W. Berglund, and J. M. Klosner. Jun 67, 53p
NASA-CR-87174, PIBAL-935
Contract NONR-839/40/

Descriptors: *Acoustics, *Circular shell, *Cylindrical shell, *Dynamic response, *Fluid mechanics, Analysis, Circular, Cylinder, Dynamic, Expansion, Fluid, Mechanics, Numerical, Pressure, Reinforced, Response, Ring, Series, Shell, Structural, Transient, Uniform, Vibration.

For abstract, see STAR 05 19.
N67-32977 HC$3.00 MF$0.65

MECHANICAL FORCE GENERATORS USING PERMANENT MAGNETS.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 13M.
For abstract, see STAR 05 19.
N67-33338 HC$3.00 MF$0.65

RESEARCH AND DEVELOPMENT PROGRAMS QUARTERLY REPORT, JAN. - MAR. 1967.
Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
For primary bibliographic entry see Field 20D.
For abstract, see STAR 05 19.
N67-33361 HC$3.00 MF$0.65

NONLINEAR FLEXURAL VIBRATIONS OF THIN-WALLED CIRCULAR CYLINDERS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
D. A. Evensen. Aug 67, 31p NASA-TN-D-4090

Descriptors: *Circular cylinder, *Galerkin method, *Vibration mode, Amplitude, Analysis, Circular, Cylinder, Differential, Equation, Excitation, External, Flexure, Force, Function, Loading, Mode, Nonlinear, Response, Thin wall, Vibration.

For abstract, see STAR 05 19.
N67-33446 HC$3.00 MF$0.65

COMPILATION OF PROJECT MOHOLE SCIENTIFIC AND TECHNICAL REPORTS FOR THE PERIOD NOVEMBER 1963 THRU SEPTEMBER 1966.
Brown and Root, Inc., Houston, Tex.
1966, 15128p
Contract NSF-C-260
Contains PB-175 000 thru PB-175 388 and PB-175 390 thru PB-175 399.

Descriptors: (*Well logging, Feasibility studies), (*Reports, Geophysical prospecting), Geology, Drilling, Ships, Drilling machines, Pipes, Marine engineering.
Identifiers: Mohole project.

Represents a collection of 399 scientific and technical reports produced on Project Mohole November 1963 thru September 1966. The collection is being offered in hard copy or microfiche at a special price. For the bibliographic citations of the individual reports see Field 8G.
PB-175 400 HC$450.00 MF$150.00

DYNAMIC BEHAVIOR OF BERYLLIUM.
Sandia Corp., Albuquerque, N. Mex.
For primary bibliographic entry see Field 11F.
For abstract, see NSA 21 16.
SC-RR-67-368 HC$3.00 MF$0.65

20L. Solid-State Physics

PHOTOELECTRONIC PROCESSES IN ZnS SINGLE CRYSTALS.
Stanford Univ Calif Dept of Materials Science
For primary bibliographic entry see Field 20F.
AD-656 796 Not available from CFSTI.

OPTICAL PROPERTIES OF THE INTERMETALLIC COMPOUNDS AuAl2, AuGa2 and AuIn2.
Revised ed.,
National Research Council of Canada Ottawa (Ontario) Div of Pure Physics

J. P. Jan. and S. S. Vishnubhatla. 7 Mar 67, 6p
Revision of manuscript submitted 13 Jan 67. Prepared in cooperation with Carleton Univ., Ottawa (Ontario). Dept. of Physics.
Availability: Published in Philosophical Magazine v16 n139 p45-50 Jul 1967.

Descriptors: (*Intermetallic compounds, Optical properties), (*Gold alloys, Optical properties), Aluminum alloys, Gallium alloys, Indium alloys, Reflection, Dielectric properties, Band theory of solids, Plasma medium, Ultraviolet spectroscopy, Absorption spectrum, Canada.

The reflectance of AuAl2, AuGa2 and AuIn2 (fluorite structure) was measured between 0.5 and 10.3 ev. The other optical constants have been calculated by means of Kramers-Kronig relations. The results can be explained qualitatively in terms of intraband transitions, and interband transitions setting in at 2.2, 2.0 and 1.7 ev respectively. A main plasma resonance was found at 7.0, 7.8 and 7.5 ev respectively. The low energy behaviour suggests the presence of several bands of conduction electrons, in agreement with Fermi surface studies. (Author)
AD-656 831 Not available from CFSTI.

PROCEEDINGS OF THE SYMPOSIUM ON THE STRUCTURE OF SURFACES, ARMY RESEARCH OFFICE, DURHAM, NORTH CAROLINA, 8-9 NOVEMBER 1966,
Army Research Office Durham N C
For primary bibliographic entry see Field 20B.
AD-656 874 Not available from CFSTI.

EVAPORATED SILICON THIN-FILM TRANSISTORS.
British Columbia Univ Vancouver Dept of Electrical Engineering
For primary bibliographic entry see Field 9A.
AD-656 877 Not available from CFSTI.

ON THE SOLID SOLUTIONS OF TIN TELLURIDE AND LEAD TELLURIDE.
Technical rept.,
Massachusetts Inst of Tech Cambridge Dept of Metallurgy
A. M. Reti, A. K. Jena, and M. B. Bever. 14 Aug 67, 12p Rept no. TR-4
Contract Nonr-3963 (19)
Prepared for presentation at the Technical Conference on 'Preparation and Properties of Electronic Materials' of the Institute of Metals Division, Metallurgical Society of AIME, New York City, 28-30 Aug 1967.

Descriptors: (*Semiconductors, Tellurides), (*Tellurides, *Solid solutions), (*Tin compounds, Solid solutions), (*Lead compounds, Solid solutions), Heat of formation, Hardness, Crystal lattices, X-ray diffraction analysis, Heat treatment.
Identifiers: Lead telluride, Tin telluride.

Work is described which shows that in the system SnTe-PbTe (1) the solid solutions have small exothermic heats of formation based on the binary compounds, (2) solid solution hardening is almost absent, (3) the Sn and Pb atoms are randomly distributed on the sublattice occupied by them and do not undergo an ordering transition during a thermal treatment designed to promote such a transition and (4) the lattice parameter changes linearly with composition. These findings suggest that the solid solutions of tin telluride and lead telluride approach ideal behavior. (Author)
AD-656 912 HC$3.00 MF$0.65

LOW TEMPERATURE MAGNETIC PHASE TRANSITIONS IN CoCl2.6H2O AND MnBr2.4H2O.
Carnegie Inst of Tech Pittsburgh Pa Dept of Physics
For primary bibliographic entry see Field 20C.
AD-656 924 Not available from CFSTI.

CONTROL OF THE SURFACE POTENTIAL OF EVAPORATED CdS LAYERS,
Simon Fraser Univ Burnaby (British Columbia) Dept of Physics
R. R. Haering, and J. F. O'Hanlon. 13 Feb 67, 2p
Availability: Published in Proceedings of the IEEE 1p May 1967.

Descriptors: (*Semiconducting films, Surface properties), (*Cadmium sulfides, Surface properties), Voltage, Control, Electrical conductance, Carriers (Semiconductors), Dielectric films, Calcium fluorides, Silicon dioxide, Canada.

A simple method is described for controlling the surface potential of semiconducting films which are covered with evaporated insulating layers. (Author)
AD-656 954 Not available from CFSTI.

THEORY OF THERMALLY STIMULATED CONDUCTIVITY IN A PREVIOUSLY PHOTOEXCITED CRYSTAL.
Stanford Univ Calif Dept of Materials Science
Gustavo A. Dussel, and Richard H. Bube. 30 Sep 66, 19p
AROD-4119:14
Contract DA-31-124-ARO (D)-73
Availability: Published in The Physical Review v155 n3 p764-79 Mar 15 1967.

Descriptors: (*Crystal lattice defects, Analysis), (*Band theory of solids, Electrical conductance), Carriers (Semiconductors), Transport properties, Excitation, Photoconductivity, Heating, Heat of activation.
Identifiers: Thermally stimulated conductivity.

The theory of thermally stimulated conductivity (TSC) for a single depth in the presence of deeper traps, and a single type of recombination center, was developed in detail without making the customary restrictive approximations and assumptions based on the relative importance of recombination or retrapping, or on the constancy of the lifetime. General conclusions about the shape of the TSC curve are presented, depending on the ratio of recombination to trapping probabilities, and on the ratio of the density of the traps of interest to that of deeper traps. The results of the theory are applied to the particular cases of first-order kinetics, strong retrapping with constant lifetime, and strong retrapping with varying lifetime. A critical discussion is given of the analysis of TSC data according to methods involving the quasi-Fermi-level, the half-widths of the TSC curve, varying heating rates, and the initial activation energy at the beginning of the TSC curve. It is concluded that the method of decayed TSC provides the most reliable determination of trap depth. The results of the theory can be readily adapted for application to systems involving more than one type of recombination center. (Author)
AD-656 961 Not available from CFSTI.

INTERACTION BETWEEN FREE ELECTRONS AND INTENSIVE LIGHT BEAM - MULTIPHOTON PROCESSES OF THE CARRIERS IN SEMICONDUCTORS,
Foreign Technology Div Wright-Patterson AFB Ohio
Ho Yu-ping. 25 Jan 67, 29p Rept no. FTD-TT-65-1053
TT-67-62631
Edited trans. of Wu Li Hsueh Pao (Chinese People's Republic), v21 n1 p37-50 1965.

Descriptors: (*Carriers (Semiconductors), Band theory of solids), (*Electromagnetic fields, Interactions), Electrons, Absorption spectrum, Germanium, Excitons, Photons, Cadmium selenides, Coherent radiation, Lasers, Wave functions, Quantum mechanics.

The paper discusses the interaction between carriers in semiconductors and a laser beam. The influence of intensive light on the intraband motion of electrons is treated. The conclusion is that the states of the electrons within one band can still be characterized by a set of quantum numbers -- the quasi-momentum p and that the wave function contains a factor describing the forced motion in the extremely strong electromagnetic field. The interband transition and other intraband scattering are then treated as perturbations. During the transition process, the forced motion changed with the absorption or emission of a number of photons. The absorption constants for multi-photon processes of free carriers absorption and the direct transition from valence band to conduction band are calculated. It was estimated that in some materials the two-photon process of the type discussed can be easily observed-especially the direct absorption of two photons in Ge. It was pointed out that using the laser light the absorption lines of the exciton may be shifted to the infrared region, so that the resolving power may be improved. The case of CdSe was discussed as an example.
AD-657 017 HC$3.00 MF$0.65

SUPERCONDUCTING TRANSITION TEMPERATURE AND ELECTRONIC STRUCTURE IN THE PSEUDOBINARIES Nb3Al-Nb3Sn AND Nb3Sn-Nb3Sb.
Technical note,
Massachusetts Inst of Tech Lexington Lincoln Lab
F. J. Bachner, J. B. Goodenough, and H. C. Gatos. 10 Aug 67, Rept no. TN-1967-37
ESD-TR-67-299
Contract AF 49 (628)-5167

Descriptors: (*Superconductors, *Band theory of solids), (*Niobium alloys, Band theory of solids), (*Solid solutions, Superconductivity), (*Intermetallic compounds, Superconductivity), Aluminum alloys, Tin alloys, Antimony alloys, Transition temperature, Phase studies, Seebeck effect.

The system Nb3AlySn1-y exhibits complete solid solubility, a positive Seebeck voltage that increases monatomically from 1.8 to over 12 microvolts/deg. K, and a superconducting transition temperature Tc that has a broad minimum of Tc approx. = 15.3K at about y = 0.5. The pseudobinary Nb3Sn1-xSbx, on the other hand, contains two phases, each with the A15 structure, in the interval $0.3 < x < 0.8$. Whereas the Seebeck voltage of the low-Sb phase is positive and has a Tc > 14K, the high Sb phase has a negative Seebeck voltage and is not superconducting above 4.2K. These properties were interpreted with the aid of a qualitative band-structure scheme. Thus, the rapid drop in Tc to below 4.2K in the system Nb3Sn1-xSbx is believed to be associated with the filling of the bonding, interchain d sub pi bands of the Nb subarray. (Author)
AD-657 020 HC$3.00 MF$0.65

NEW SOLID-STATE DEVICE CONCEPTS,
General Electric Co Schenectady N Y Research and Development Center
For primary bibliographic entry see Field 9A.
AD-657 023 HC$3.00 MF$0.65

MAGNETIC AND STRUCTURAL STUDY OF THE SPINEL MnYb2S4.
Technical note,
Massachusetts Inst of Tech Lexington Lincoln Lab
John M. Longo, and Paul M. Raccah. 9 Aug 67, 11p Rept no. TN-1967-36
ESD-TR-67-340
Contract AF 19 (628)-5167

Descriptors: (*Spinels, Crystal lattices), (*Manganese compounds, Magnetic properties), (*Ytterbium compounds, Sulfides), Sulfides, X-ray diffraction analysis, Crystal structure, Interactions, Thermal properties, Magnetic materials.
Identifiers: Manganese ytterbium sulfide, Magnetic susceptibility.

The compound MnYb2S4 has the normal spinel structure with no measurable mixing of atoms in octahedral and tetrahedral sites. The sulfur parameter is 0.380 plus or minus 0.002, which is lower than usually found in spinels. Magnetic susceptibility shows no magnetic order to liquid He temperature and a temperature dependence that is the simple sum of the theoretical contributions for Yb (3+) and Mn (2+) ions. (Author)
AD-657 032 HC$3.00 MF$0.65

RESEARCH IN PURIFICATION AND SINGLE GROWTH OF II-VI COMPOUNDS.
Interim rept. 15 Apr 65-14 Apr 67,
Eagle-Picher Industries Inc Miami Okla Miami Research Labs
Richard H. Fahrig, George N. Webb, and Lloyd W. Brown. Apr 67, 61p
ARL-67-0070
Contract AF 33 (615)-2947

Descriptors: (*Semiconductors, Preparation), (*Crystal growth, Semiconductors), Cadmium, Purification, Impurities, Spectroscopy, Cadmium sulfides, Crystallization, Zinc sulfides, Cadmium selenides, Cadmium compounds, Zinc compounds, Selenides, Tellurides, Oxides, Doping, Furnaces.
Identifiers: Cadmium telluride, Zinc oxide, Zinc selenide, Zinc telluride.

A process for the purification of cadmium metal by multiple treatment steps is described. Impurities in cadmium, as determined by emission spectrographic, mass spectrographic, and atomic absorption are given in tabular form. The preparation of various pure semiconductor materials of the Group II-VI compound type is discussed and tables of analytical data for each are included. The level of impurity concentration in synthesized cadmium sulfide was significantly lowered. Less than 1 part per million (atomic) total impurities was found by the mass spectrograph in two batches of CdS. The growth of crystals of pure II-VI compounds and mixtures of compounds from the melt is reported. Included are data concerning doping of melt grown crystals with various elemental dopants, and, in the case of some compound semiconductors, the maximum doping levels possible by this method. (Author)
AD-657 045 HC$3.00 MF$0.65

EVIDENCE FOR A SINGLET GROUND STATE IN THE MAGNETIC IMPURITY PROBLEM,
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
M. A. Jensen, A. J. Heeger, L. B. Welsh, and G. Gladstone. 26 Apr 67, 5p
AFOSR-67-1876
Grants AF-AFOSR-1149-66, NSF-GP-4178
Availability: Published in Physical Review Letters v18 n23 p997-1000 Jun 5 1967.

Descriptors: (*Iron alloys, *Nuclear magnetic resonance), (*Crystal lattice defects, Ground state), Copper, Impurities, Magnetic materials, Magnetic moments, Nuclear spins.

Nuclear-magnetic-resonance studies on dilute alloys of Fe in Cu metal give evidence for the existence of a singlet ground state for the magnetic impurity problem. The moment on the impurity is found to increase linearly with magnetic field but is independent of temperature in the region kT << (mu sub B)H << k (T sub K). (Author)
AD-657 051 Not available from CFSTI.

GROUND STATE OF THE KONDO MANY-BODY SCATTERING PROBLEM,
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
A. J. Heeger, and M. A. Jensen. 16 Jan 67, 5p
AFOSR-67-1875
Grant AF-AFOSR-1149-66
Availability: Published in Physical Review Letters v18 n13 p488-91 Mar 27 1967.

Descriptors: (*Crystal lattice defects, Ground state), (*Magnetic materials, Impurities), Band theory of solids, Electrons, Scattering, Interactions, Antiferromagnetism, Nuclear spins, Atomic energy levels.

The logarithmic divergence in the conduction-electron-magnetic-impurity scattering amplitude found by Kondo suggested the possibility of an instability in the system at sufficiently low temperatures. The ground state of this problem is investigated by means of a many-body variational calculation and show that for an antiferromagnetic s-d exchange interaction a bound state does exist.
AD-657 052 Not available from CFSTI.

THE RAMAN SPECTRUM OF BaTiO3,
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
A. Pinczuk, W. Taylor, E. Burstein, and L. Lefkowitz. 22 Mar 67, 8p
AROD-4882:4
Contract DA-31-124-ARO (D)-239
Prepared in cooperation with Frankford Arsenal, Philadelphia, Pa. Pittman-Dunn Lab.
Availability: Published in Solid State Communications v5 p429-33 1967.

Descriptors: (*Barium compounds, *Raman spectroscopy), (*Titanates, Raman spectroscopy), (*Phonons, Raman spectroscopy), Polarization, Propagation, Crystal lattices.
Identifiers: Barium titanate.

The polarization of the Raman Spectrum of BaTiO3 was studied for different scattering geometries. The frequencies and symmetries of most of the Raman active pure symmetry phonons were determined. A transverse mode with E1 symmetry was found in the vicinity of 5/cm. A brief analysis of the Raman Spectra of the 45 deg. phonons is given. The application of the Lyddane, Sachs, Teller relation to the A1 modes is also discussed. (Author)
AD-657 099 Not available from CFSTI.

PHONON-INDUCED ION-ION COUPLING IN PARAMAGNETIC SALTS,
California Univ Los Angeles Dept of Physics
R. Orbach, and M. Tachiki. 19 Dec 66, 6p
Contract Nonr-233 (88)
Research supported in part by NSF.
Availability: Published in The Physical Review v158 n2 p524-9 Jun 10 1967.

Descriptors: (*Paramagnetic materials, *Phonons), Salts, Ions, Interactions, Vibration, Band theory of solids.
Identifiers: Ion-ion coupling.

The zero-point phonon vibrations in a paramagnetic crystal are shown to give rise to an effective ion-ion coupling. Expressions are derived for ion-energy transitions delta both greater and less than the phonon-cutoff energy hw0. In the former case, the coupling is short range. In the latter case, a slowly decreasing oscillatory range dependence is obtained. When the ionic separation is greater than the phonon wavelength appropriate to the transition energy, the coupling due to transverse phonons falls off very slowly. Finally, in the limit of vanishing delta, the results go over smoothly to a range dependence similar to that found by Sugihara, and Aminov and Kochelaev. Numerical estimates are made for the strength of the coupling coefficient.
AD-657 101 Not available from CFSTI.

HELICONS, MAGNETOPLASMA EDGE, AND FARADAY ROTATION IN SOLID STATE PLASMAS AT MICROWAVE FREQUENCIES,
Massachusetts Inst of Tech Cambridge National Magnet Lab
Jacek K. Furdyna. 27 Dec 66, 12p Rept no. JP-262
AFOSR-67-1869
Contract F44620-67-C-0047
Availability: Published in Applied Optics v6 p675-84 Apr 1967.

Descriptors: (*Plasma medium, *Semiconductors), (*Magneto-optic effect, Semiconductors), Magnetic fields, Microwaves, Carriers (Semiconductors), Extremely high frequency, Indium antimonides, Anisotropy, Polarization, Solid state physics.
Identifiers: Wave equation.

The effect of magnetic field on propagation of electromagnetic waves through free carrier plasmas in semiconductors is discussed. The Faraday configuration and the parameter ranges omega sub c, omega sub p >> omega and omega sub c >> 1/r are specifically considered. Dispersion of helicon waves, propagation near the magnetoplasma edge (omega sub p) squared = (omega) omega sub c, and the Faraday rotation are developed in terms of the one-electron Drude theory. Microwave transmission measurements at 35 Gc/s on n-type InSb are presented. Experiments near the magnetoplasma edge yield the value of the static dielectric constant of the InSb lattice K sub l = 19.3 plus or minus 0.8. Faraday rotation, observed beyond the edge, is found to be extremely large. Some practical possibilities for this effect are considered. (Author)
AD-657 105 Not available from CFSTI.

EXPERIMENTAL VERIFICATION OF THE FERMI-DIRAC DISTRIBUTION OF ELECTRONS IN GALLIUM,
Massachusetts Inst of Tech Cambridge National Magnet Lab
Y. Shapira, and L. J. Neuringer. 17 May 67, 4p
AFOSR-67-1884
Contract F44620-67-C-0047
Availability: Published in Physical Review Letters v18 n25 p1133-5 Jun 19 1967.

Descriptors: (*Gallium, Distribution functions), Electrons, Ultrasonic radiation, Absorption, Oscillation, Quantum statistics, Phonons, Interactions.
Identifiers: Fermi-Dirac statistics.

The line shape of the giant quantum oscillations in the ultrasonic absorption of very pure gallium at low temperatures was used to determine the electron distribution function F (E). It was found that F (E) was equal to the Fermi-Dirac function f (E). (Author)
AD-657 106 Not available from CFSTI.

MOSSBAUER EVIDENCE FOR A SPIN-COMPENSATED STATE IN DILUTE Fe-Cu ALLOYS,
Massachusetts Inst of Tech Cambridge National Magnet Lab
R. B. Frankel, N. A. Blum, Brian B. Schwartz, and Duk Joo Kim. 10 May 67, 4p Rept no. JP-247
AFOSR-67-1841
Contract F44620-67-C-0047
Availability: Published in Physical Review Letters v18 n24 p1051-3 Jun 12 1967.

Descriptors: (*Ferromagnetic materials, *Mossbauer effect), (*Iron alloys, *Nuclear spins), Copper alloys, Impurities, Magnetic moments, Band theory of solids, Magnetic fields, Hyperfine structure.

Mossbauer effect experiments on dilute Fe in Cu are interpreted in terms of the formation of a spin-compensated state at low temperatures and the destruction of the spin-compensated state by applied magnetic fields. (Author)
AD-657 107 Not available from CFSTI.

MATERIALS PREPARATION AND CHARACTERIZATION RESEARCH.
Technical summary rept. 1 Jul 66-30 Jun 67,
Pennsylvania State Univ University Park Materials Research Lab

Rustum Roy. 30 Jun 67, 69p
Contract DA-49-083-OSA-3140, ARPA Order-338
See also AD-637 846.

Descriptors: (*Crystal growth, Scientific research), (*Single crystals, Analysis), Materials, Preparation, Semiconductors, Calcite, Germanium compounds, Oxides, Silicon dioxide, Mercury compounds, Sulfides, Zinc sulfides, Magnesium, Lead compounds, Sulfides, Tellurides, Nucleation, Electron beams, X-ray spectroscopy, Luminescence, Electron microscopes, Iodides, Crystal structure, Crystal lattice defects, Thermometers.

Research progress and results in the following areas are reported: Growth of 'large' crystals (flux method, hydrothermal growth, growth from melt, traveling solvent method, vapor growth, nucleation studies); new growth techniques (growth of concentrated crystalline solutions, crystal growth in gels, plasma synthesis); application of the electron microprobe to the characterization of solids; new technique for the study of extended x-ray absorption fine structures; instrumentation for vacuum path recording of x-ray absorption structure; instrumentation for studies of x-ray-excited luminescence; scanning electron microscope; polytypism in PbI2; dislocation probe technique for characterization of defects induced by surface contamination and gamma-irradiation; characterization by x-ray methods; structure analysis and crystal physics; the system, Zn-Fe-S as a geothermomter.
AD-657 237 HC$3.00 MF$0.65

CALIBRATION AND USE OF AN ELECTRON MICROSCOPE FOR PRECISION MICRO-MEASUREMENTS IN THIN FILM MATERIALS,
Pennsylvania State Univ University Park Materials Research Lab
L. E. Murr. 5 Aug 66, 30p
AFOSR-67-1933
Grant AF-AFOSR-669-66
Availability: Published in Phys. Stat. Sol. v19 p7-34 1967.

Descriptors: (*Metal films, Electron microscopy), (*Electron microscopes, Calibration), Images, Electron diffraction-analysis, Crystal lattices, Crystal lattice defects, Grain structures (Metallurgy), Reviews.

The review article treats the following topics: Image magnification calibration; diffraction pattern calibration; examples of special electron diffraction (double and multiple diffraction, extra diffraction spots, streaking in the diffraction pattern); image-pattern rotation calibration; some aspects of diffraction contrast (bright-field images, dark-field images); structural geometry in thin metal foils.
AD-657 243 Not available from CFSTI.

RAMAN SCATTERING BY COUPLED PLASMON - LONGITUDINAL - OPTICAL - PHONON MODES IN ZINCBLENDE-TYPE CRYSTALS,
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
E. Burstein, A. Pinczuk, and S. Iwasa. 5 Dec 66, 6p
AROD-4882:3
Contract DA-31-124-ARO (D)-239
Availability: Published in The Physical Review v157 n3 p611-4 May 15 1967.

Descriptors: (*Semiconductors, Optical properties), Scattering, Gallium arsenides, Electric fields, Phonons, Electrooptics, Carriers (Semiconductors).
Identifiers: Raman scattering, Zincblende-type crystals.

A phenomenological theory of Raman scattering by the q approximately equal to 0 coupled plasmon- (LO) longitudinal-optical-phonon modes, which takes into account the electro-optic effect of the longitudinal electric fields associated with the coupled modes, is presented. Estimates of the scattering efficiency of the plasmon-like mode at high carrier densities, for which the major contribution comes from the electro-optic effect, are obtained using values of the electro-optic coefficient derived from second-harmonic light-generation data. For n-type GaAs with a carrier density of 3 x 10 to the 18th power/cc, the scattering efficiency of the plasmon-like mode is found to be 1 x 10 to the -5th power. The theoretical treatment is also applicable to Raman scattering by the collective cyclotron excitation modes of free carriers in a magnetic field and by their coupled modes with LO phonons. (Author)
AD-657 272 Not available from CFSTI.

STATISTICAL CONSIDERATIONS IN MOSFET CALCULATIONS.
Revised ed.,
California Univ Berkeley Electronics Research Lab
T. I. Kamins, and R. S. Muller. 13 Dec 66,
AROD-5537:3
Contract DA-31-124-ARO (D)-385
Revision of manuscript received 25 Oct 66.
Availability: Published in Solid-State Electronics v10 p423-31 1967.

Descriptors: (*Field effect transistors, Statistical mechanics), (*Semiconductors, Electrical conductance), Carriers (Semiconductors), Cadmium sulfides, Silicon, Films, Transport properties, Approximation (Mathematics), Performance (Engineering), Surface properties, Quantum statistics.
Identifiers: Maxwell-Boltzmann statistics, Fermi-Dirac statistics.

The use of statistics in the calculation of the performance of MOS field-effect devices is considered. Since MOSFET's frequently operate with degenerate free-carrier concentrations at their surfaces, the proper formulation of the dependence of source-drain conductance in terms of Fermi-Dirac statistics is discussed. Exact calculations are compared with results based on approximations that employ Maxwell-Boltzmann statistics. Computer solutions for both the accurate and the approximate statistical formulations are given. The results are interpreted in terms of present technologies for silicon MOS structures and deposited CdS thin-film transistors. Inequalities are derived which permit an evaluation of the accuracy of Maxwell-Boltzmann statistics for calculation of source-drain conductance for an unspecified semiconductor. It is shown that this approximate procedure suffices for practical devices. (Author)
AD-657 274 Not available from CFSTI.

OPTICAL PROPERTIES OF ZINC TELLURIDE,
Purdue Univ Lafayette Ind Dept of Physics
R. E. Nahory, and H. Y. Fan. 9 Nov 66, 13p
AROD-3655:26
Contract DA-31-124-ARO (D)-17
Availability: Published in Physical Review v156 n3 p825-33 Apr 15 1967.

Descriptors: (*Semiconductors, Optical properties), (*Zinc compounds, Optical properties), (*Tellurides, Optical properties), Band theory of solids, Crystal lattices, Phonons, Crystal lattice defects, Impurities, Arsenic, Indium, Iron, Spectra (Visible + ultraviolet), Spectra (Infrared), Excitons, Absorption spectrum.
Identifiers: Zinc telluride.

The optical absorption of ZnTe single crystals grown by the Bridgeman method was studied from visible wavelengths to 50 microns, at temperatures from 1.4 to 300K. Lattice combination bands are observed from which assignments of zone-boundary phonon energies are made: LO = TO = 22, LA = 16, TA = 0.007 eV. The temperature dependence of the absorption is discussed. Absorption due to inter-valence-band transitions has been observed, which indicates the presence of two bands degenerate at k = 0 and a split-off band lying 1 eV below. Infrared absorption is observed for As impurity in the range 0.05 to 0.1 eV and for a residual impurity in undoped material, probably a zinc vacancy, in the range 0.1 to 0.9 eV. For each impurity, absorption due to transitions to the split-off valence band is also observed near 1 eV. Sharp excitation lines are seen in the spectrum of the residual impurity. The lines are repeated with emission of optical phonons of energy 0.026 eV, from which the electron-phonon coupling coefficient is estimated. Some structure is observed also in the spectrum of As impurity. The intrinsic absorption edge was measured at 1.7, 80, and 300K. The energy gap is determined to be 2.385, 2.37, and 2.25 eV, respectively. A tail is observed at the absorption edge which shows the effect of various impurity levels in the undoped material and in the samples doped with As, In, or Fe. In two samples grown from the vapor phase, some sharp absorption lines are present in the range 2.2 to 2.35 eV. These lines are apparently due to exciton-impurity complexes. (Author)
AD-657 278 Not available from CFSTI.

RADIATION DAMAGE IN SEMICONDUCTORS.
Final rept. 1 Jul 65-30 Jun 66,
Ecole Normale Superieure Paris (France) Laboratoire de Physique
P. Baruch, A. Brelot, K. Matsui, J. Zizine, and J. Bourgoin. Dec 66, 55p
AFCRL-67-0160
Contract AF 61 (052)-543

Descriptors: (*Radiation damage, Semiconductors), (*Semiconductors, Transport properties), Germanium, Silicon, Photoconductivity, Crystal lattice defects, Diffusion, Annealing, France, Electrical properties.

Work is reported in the following areas: (1) Photon irradiation enhanced diffusion in germanium at temperatures above 600 degrees C; (2) Photoconductivity of electron-irradiated silicon at 20 degrees K; (3) Low temperature annealing of N-type germanium; (4) Fast annealing of pulse-irradiated germanium (preliminary work in progress).
AD-657 365 HC$3.00 MF$0.65

EQUILIBRIUM SPIN CONFIGURATION AND RESONANCE BEHAVIOR OF RbMnF3,
Massachusetts Inst of Tech Cambridge Microwave and Quantum Magnetics Group
For primary bibliographic entry see Field 20C.
AD-657 374 HC$3.00 MF$0.65

PRECIPITATION EFFECTS IN SEMICONDUCTORS.
Final rept.,
Minnesota Univ Minneapolis
R. A. Swalin. Aug 67, 7p
Contract Nonr-710 (27)

Descriptors: (*Crystal lattice defects, *Semiconductors), (*Transport properties, Semiconductors), Germanium, Silicon, Lithium, Nucleation, Diffusion, Physical properties.

A brief description is presented concerning the results obtained under terms of the Office of Naval Research Contract. Reference is made to the previous technical reports and publications in which complete discussion of the various phenomena is presented. Nucleation of lithium precipitates in Si and Ge; Theoretical calculations relating to diffusion in elemental semiconductors; Thermal diffusion studies; Self-diffusion in silicon; Further precipitation studies.
AD-657 381 HC$3.00 MF$0.65

RECOMBINATION AND DIFFUSION IN INJECTED ELECTRON-HOLE PLASMAS,
Boeing Scientific Research Labs Seattle Wash
Betsy Ancker-Johnson, and William P. Robbins. Aug 67, 23p Rept no. D1-82-0630
Prepared in cooperation with Washington Univ., Seattle. Dept. of Electrical Engineering.

Descriptors: (*Plasma medium, *Semiconductors), Indium antimonides, Magnetic fields, Carriers (Semiconductors), Diffusion, Transport properties, Electric currents.

The decay of injected plasmas, produced in p-InSb at 77 K, between 20 nsec and 5 microsec after the driving voltage is cut off is being studied in the absence and presence of magnetic fields. The purpose of the present investigation is to try to determine the loss mechanisms and then influence the plasma decay by various magnetic field configurations. What is presently known about the steady-state distribution before decay is allowed to begin is described first. Then it is shown that the properties of the early decay depend on initial density, but all decay becomes exponential in time after approximately 700 nsec. The fundamental mode of decay in which carriers everywhere in the sample are lost at the same rate is not established by 5 microsec. The preliminary results on decay of a plasma placed in an axial magnetic field show that the number of particles remaining after a given time, e.g., 50 nsec, is reduced as the field is raised from 0 to approximately 150 G and then, with a further slight increase in field strength, markedly enhanced. This enhancement extends over only a narrow interval of magnetic field. Sometimes oscillations in the number of surviving particles are observed as a function of magnetic field.
AD-657 401 HC$3.00 MF$0.65

PARAMAGNETIC RELAXATION.
Final rept.,
Johns Hopkins Univ Baltimore Md Carlyle Barton Lab
P. E. Wagner, W. J. Brya, R. F. David, P. D. Fisher, and D. R. Lampe. Sep 67, 31p Rept no. 15
Contracts AF 33 (657)-11029, AF 33 (615)-3585
Availability: Published in Various journals.

Descriptors: (*Paramagnetic resonance, Relaxation time), (*Crystal lattice defects, Relaxation time), Cerium, Lanthanum compounds, Magnesium compounds, Nitrates, Impurities, Semiconductors, Seebeck effect, Cyclotron resonance phenomena, Rutile, Chromium, Microwave spectroscopy, Potassium compounds, Cyanides, Phonons.

Contents: Direct, Orbach, and Raman relaxation in dilute cerous magnesium nitrate (Phys. Rev. v147 p239 1966); Thermoelectric cyclotron resonance in semiconductors (App. Phys. Letters v9 p153 1966); Paramagnetic relaxation and crystal-field theory for the ground manifold of chromium in rutile (J. Chem. Phys. v45 p1405 1966); Angular dependence of paramagnetic relaxation for (2)T2 states in rhombic symmetry: general theory and application to K3 (Co, Fe) (CN)6 (Phys. Rev. v150 p192 1966); Dynamic interaction between paramagnetic ions and resonant phonons in a bottleneck lattice (Phys. Rev. v157 p400 1967).
AD-657 424 Not available from CFSTI.

THE COVALENT BOND IN CRYSTALS. I. ELEMENTS OF A STRUCTURAL THEORY,
Chicago Univ Ill
For primary bibliographic entry see Field 20B.
AD-657 432 HC$3.00 MF$0.65

THE COVALENT BOND IN CRYSTALS. II. PARTIALLY IONIC BINDING,
Chicago Univ Ill
For primary bibliographic entry see Field 20B.
AD-657 433 HC$3.00 MF$0.65

THE COVALENT BOND IN CRYSTALS. III. ANISOTROPY AND QUADRUPOLE MOMENTS,
Chicago Univ Ill
For primary bibliographic entry see Field 20B.
AD-657 434 HC$3.00 MF$0.65

THE COVALENT BOND IN CRYSTALS. IV. LATTICE DEFORMATION ENERGIES,
Chicago Univ Ill
For primary bibliographic entry see Field 20B.
AD-657 435 HC$3.00 MF$0.65

RESEARCH ACTIVITIES IN THE FIELD OF MATERIALS SCIENCE.
North Carolina Univ Chapel Hill Materials Research Center
For primary bibliographic entry see Field 11G.
AD-657 438 HC$3.00 MF$0.65

TRANSPORT PROPERTIES OF THE 'EXCITONIC INSULATOR'. I. ELECTRICAL CONDUCTIVITY.
Technical rept.,
California Univ San Diego La Jolla Dept of Physics
Johannes Zittartz. 4 Aug 67, 30p Rept no. TR-47
Contract Nonr-2216 (11)
See also AD-657 440.

Descriptors: (*Dielectrics, Electrical conductance), (*Excitons, Transport properties), Band theory of solids, Carriers (Semiconductors), Interactions, Superconductors, Mathematical models, Thermodynamics, Solids.

The d.c. conductivity of the 'excitonic insulator' recently discussed in the literature is calculated in the semimetallic region. The calculations are based on recent work on the description of the excitonic phase in the presence of impurities. It is shown that the conductivity decreases below the transition temperature to the excitonic state. For low impurity concentrations the system acquires insulating properties. For higher concentrations of impurities the conductivity is still finite at T = 0. Thus, metallic properties prevail in the excitonic phase. It is pointed out that this behavior depends essentially on the form of the excitation spectrum of the system, i.e. the presence or absence of a gap. At the transition temperature the conductivity versus temperature curve has a finite slope. (Author)
AD-657 439 HC$3.00 MF$0.65

TRANSPORT PROPERTIES OF THE 'EXCITONIC INSULATOR'. II. THERMAL CONDUCTIVITY.
Technical rept.,
California Univ San Diego La Jolla Dept of Physics
Johannes Zittartz. 8 Aug 67, 21p Rept no. TR-48
Contract Nonr-2216 (11)
See also AD-657 439.

Descriptors: (*Dielectrics, Thermal conductivity), (*Excitons, Transport properties), Scattering, Band theory of solids, Superconductors, Thermodynamics, Solids, Carriers (Semiconductors), Mathematical analysis.

The thermal conductivity of the excitonic insulator is calculated in the semimetallic limit. At low temperatures the main scattering mechanism is assumed to be due to impurities. Despite a recent claim of 'superthermal conductivity' of the system which can be described as a condensate of electron-hole pairs we find that the thermal conductivity is 'well behaved.' It is shown that the thermal conductivity in the semimetallic limit of the underlying two band model is almost identical to the thermal conductivity of a superconductor containing magnetic impurities as scatterers. The analogy stems from the fact that the thermodynamic properties in both cases are similar as was discussed recently. (Author)
AD-657 440 HC$3.00 MF$0.65

LOW TEMPERATURE INFRARED PHOTOCONDUCTORS.
RCA Labs Princeton N J
For primary bibliographic entry see Field 20F.
AD-657 445 HC$3.00 MF$0.65

FREQUENCY RANGE OF THE MICROWAVE EMISSION FROM InSb,
Texas Univ Austin Dept of Electrical Engineering
D. K. Ferry, R. W. Young, and A. A. Dougal. 4 Mar 67, 3p
AFOSR-67-1893
Grant AF-AFOSR-766-66
Availability: Published in Zeitschrift fuer Naturforschung v22a n4 p576 1967.

Descriptors: (*Indium antimonides, Microwave frequency), P band, L band, Ultrahigh frequency, Magnetic fields, Electric fields, Spectrum analyzers.
Identifiers: Gunn effect.

Experimental studies on the radio frequency emission from InSb under the influence of electric and magnetic fields in the range of 10 MHz to GHz are presented. Studies were made of the frequency spectrum of the low field microwave emission from indium antimonide in a frequency range from a few megahertz up to ten gigahertz, showing that the emission is much broader than had earlier been assumed. Samples of indium antimonide were mounted as center conductor of a coaxial transmission line which was connected to a spectrum analyzer used as a microwave receiver, and pulsed electric and magnetic fields were applied to the samples in an ambient temperature of 77K. (Author)
AD-657 466 Not available from CFSTI.

EXCHANGE INTERACTION BETWEEN NEAREST-NEIGHBOR ION PAIRS. II. V (2+) IN MgO,
California Univ Los Angeles Dept of Physics
Nai Li Huang. 12 Dec 66, 11p
Contract Nonr-233 (88)
Availability: Published in Physical Review v157 n2 p378-88 May 10 1967.

Descriptors: (*Crystal lattice defects, Interactions), (*Vanadium, *Atomic orbitals), Magnesium oxides, Impurities, Excitation, Atomic energy levels, Integrals, Electrons, Spin.

The configuration-interaction method is applied to the (right-angle) exchange interaction between nearest-neighbor V2+ ion pairs in MgO. Specific configurations under consideration are the ionic configuration, all allowed anion-to-cation charge-transfer configurations, and the most important cation-to-cation charge-transfer configuration. Numerical calculations are performed for the exchange interactions between individual 3d-electron pairs. The exchange coupling constant J (AB) associated with the exchange energy -2J (AB)S (A).S (B) between total spins of two V (2+) ions is deduced by projecting the single electronic spin onto the total spin. Its value is found to be 8.2K (ferromagnetic). The lack of orthogonality between neighboring cation 3d orbitals is shown to be very important for the exchange coupling between two magnetic ions at right angles to an intervening anion. The sign of the contribution to the exchange integral arising from this nonorthogonality depends on the symmetry of electron orbitals. For the specific cases under consideration, these contributions are found to be of overriding numerical importance. (Author)
AD-657 503 Not available from CFSTI.

TECHNIQUE AND APPARATUS FOR DETERMINING THE RESPONSE OF SCINTILLATORS AND SEMICONDUCTORS TO LOW ENERGY X-RAY EXCITATION,
Stanford Univ Calif High Energy Physics Lab
For primary bibliographic entry see Field 20H.
AD-657 526 Not available from CFSTI.

CONDUCTIVITY PHENOMENA IN POLYCRYSTALLINE ZINC OXIDE FILMS.
Brown Engineering Co., Inc., Huntsville, Ala. Research Labs.
M. L. Mc Daniel, R. R. Mitchell, and H. J. Watson. Jun 67, 30p NASA-CR-87157, R-237
Contract NAS8-20166

Descriptors: *Electric conductivity, *Photoconductivity, *Radiation effect, *Thin film, *Zinc oxide, Conductivity, Effect, Electric, Film, Oxide, Polycrystal, Pressure, Radiation, Rate, Response, Thickness, Thin, Time, Zinc.

For abstract, see STAR 05 19.
N67-32746 HC$3.00 MF$0.65

PRODUCTION AND ANNEALING OF INTRINSIC DEFECTS IN X- RAY IRRADIATED CD S SINGLE CRYSTALS.
Delaware Univ., Newark. Dept. of Physics.
K. W. Boer, and J. C. Oconnell. May 67, 15p
NASA-CR-TR-18, TR-13
Grant NSG-573, Contract NONR-4336/00/

Descriptors: *Annealing, *Cadmium sulfide, *Crystal structure defect, *Single crystal, *X-ray irradiation, Cadmium, Crystal, Damage, Defect, Electric, Intrinsic, Irradiation, Production, Property, Single, Structure, Sulfide, Vapor, X-ray.

For abstract, see STAR 05 19.
N67-32995 HC$3.00 MF$0.65

DIFFUSION ALONG AND AROUND DISLOCATIONS.
Commissariat A L Energie Atomique, Saclay (France). Centre D'etudes Nucleaires.
For primary bibliographic entry see Field 20B.
For abstract, see STAR 05 19.
N67-33285 HC$3.00 MF$0.65

RESEARCH AND DEVELOPMENT PROGRAMS QUARTERLY REPORT, JAN. - MAR. 1967.
Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
For primary bibliographic entry see Field 20D.
For abstract, see STAR 05 19.
N67-33361 HC$3.00 MF$0.65

LOW TEMPERATURE SPECIFIC HEAT OF CARBIDES V2C, NB2 C, MO2 C, AND V MO C.
Chaleur Specifique Electronique des Carbures V2c, Nb2c, Mo2c Et Vmoc
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
R. Caudron, P. Costa, and B. Saulgeot. 1967, 10p ONERA-TP-480/1967/
in French, English Summary Presented At the 2d Intern. Colloq. on Solid Compds. of Transition Elem., Groningen, Netherlands, 12-16 Jun. 1967

Descriptors: *Cryogenic temperature, *Molybdenum carbide, *Niobium carbide, *Specific heat, *Vanadium carbide, Carbide, Coefficient, Cryogenic, Crystal, Electronic, Ground, Heat, Molybdenum, Niobium, Specific, State, Structure, Temperature, Vanadium.

For abstract, see STAR 05 19.
N67-33425 HC$3.00 MF$0.65

ELECTRONIC SPECIFIC HEATS AT LOW TEMPERATURE OF TANTALUM HYDROGEN COMPOUNDS.
Chaleurs Specifiques Electroniques A Basse Temperature des Composes Tantale-hydrogene
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
R. Caudron, P. Costa, F. Ducastelle, and B. Saulgeot. 1967, 18p ONERA-TP-479/1967/
in French, English Summary Presented At the 2d Intern. Colloq. on Solid Compds. of Transition Elem., Groningen, Netherlands, 12-16 Jun. 1967

Descriptors: *Cryogenic temperature, *Hydrogen compound, *Specific heat, *Tantalum compound, Coefficient, Compound, Cryogenic, Debye temperature, Electronic, Heat, Hydrogen, Ionization, Specific, Superconductivity, Tantalum, Temperature.

For abstract, see STAR 05 19.
N67-33426 HC$3.00 MF$0.65

ELECTRONIC STRUCTURE OF TRANSITION CARBIDES AND NITRIDES.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 7D.
For abstract, see STAR 05 19.
N67-33967 HC$3.00 MF$0.65

20M. Thermodynamics

DYNAMICS AND THERMODYNAMICS OF VISCOELASTIC MEDIA.
Final rept. 1962-1966,
North Carolina State Univ Raleigh
P. H. McDonald. Jun 67, 75p
Contract DA-01-009-ORD-991

Descriptors: (*Viscoelasticity, *Thermodynamics), Dynamics, Continuum mechanics, Theory, Heat, Differential equations.

A fundamental thermodynamic theory was developed which is applicable to the class of materials and regimes of excitation intended in the object of the study. An experimental apparatus was designed, constructed and operated for the purpose of measuring the relevant and significant materials properties. A particular material, a room-temperature-vulcanizing rubber, was studied quantitatively in the range 5 to 25 KHz. (Author)
AD-656 943 HC$3.00 MF$0.65

EFFECTIVE INTERACTION OF He3 ATOMS IN DILUTE SOLUTIONS OF He3 IN He4 AT LOW TEMPERATURES,
Illinois Univ Urbana
John Bardeen, G. Baym, and D. Pines. 10 Nov 66, 18p
AROD-431:78-P
Contract DA-31-124-ARO (D)-114, Grant NSF-GP-4937
Research supported in part by ARPA.
Availability: Published in The Physical Review v156 n1 p207-21 Apr 5 1967.

Descriptors: (*Liquefied gases, Helium), (*Helium, Interactions), Superfluidity, Nuclear spins, Phase studies, Phonons, Isotopes, Solutions, Transition temperature, Quantum statistics, Thermodynamics, Cryogenics.

The approximate form of the effective interaction between He3 atoms in superfluid He4 is derived from the experimental data on spin diffusion and phase separation in dilute mixtures of He3 in He4. The interaction is weak, and attractive at long wavelengths. Calculations of the Fermi-liquid parameters for the normal state of He3 in solution yield results for the effective mass and spin susceptibility in agreement with experiment. The temperature for a superfluid transition associated with the He3 is estimated to be approx. 0.000002K; the maximum solubility of He3 in He4 is found to be approx. 6% at T = 0. Thermodynamic and microscopic arguments are used to calculate the long-wavelength part of the effective interaction between the He3 atoms. The contribution arising from the exchange of a virtual He4 phonon is shown to be large and attractive, while the remaining part of the interaction is almost as large but repulsive; the calculated interaction at long wavelengths is thus weak and attractive and is in excellent agreement with that determined empirically; the physical origin of the weakness of the interaction is that He3 is an isotopic impurity. Finally, it is estimated that the application of pressure serves to weaken the effective interaction. (Author)
AD-656 962 Not available from CFSTI.

LOW-TEMPERATURE SPECIFIC HEAT OF ANTIMONY,
California Univ Riverside
D. C. McCollum, and William A. Taylor. 19 Sep 66, 5p
AFOSR-67-1845
Grant AF-AFOSR-949-65
Availability: Published in Physical Review v156 n3 p782-4 Apr 15 1967.

Descriptors: (*Specific heat, *Antimony), Low-temperature research, Helium, Thermometers, Least squares method, Calibration, Measurement, Tables.

The specific heat of antimony has been measured from 0.54 to 4.0K. A least-squares fit to the data in the 0.54 to 1.1K range gave C = (0.105 plus or minus 0.002)T + (0.210 plus or minus 0.002)T (3+) (0.0048 plus or minus 0.0004)T (2-) mJ/mole K and a Debye temperature of 210.0 plus or minus 0.7K. The uncertainties are rms deviations of the means. These results are in good agreement with specific-heat, Fermi-surface, and quadrupole-resonance data. Thermometer calibration in the He (3) range is discussed. (Author)
AD-656 988 Not available from CFSTI.

DEVELOPMENT OF HIGH TEMPERATURE THERMAL CONDUCTIVITY STANDARDS,
Technical rept. 3 May 65-3 Nov 66,
Little (Arthur D) Inc Cambridge Mass
Alfred E. Wechsler. Jan 67, 143p
AFML-TR-66-415
Contract AF 33 (615)-2874

Descriptors: (*Thermal conductivity, Standards), Ceramic materials, Metals, Intermetallic compounds, Graphite, Thermal diffusion, Phase studies, Mechanical properties, High-temperature research, Tungsten, Oxides.

An analytical and experimental study was proposed to establish high temperature thermal conductivity and diffusivity standards and to test these standards. The report describes the identification, selection, characterization and preliminary experimental examination of candidate standard materials for use in the subsequent measurement program. Based on criteria such as phase change, melting point, reproducibility, isotropy, fabricability, homogeneity, and availability, the following materials were selected for experimental evaluation: ceramics--alumina, beryllia, thoria, calcium zirconate, and yttria-stabilized zirconia; intermetallics--silicon carbide, boron carbide, titanium carbide, and zirconium diboride; metals--molybdenum, tantalum, tungsten, tantalum-10% tungsten, and molybdenum-30% tungsten; graphites--ATJ, CEQ, RVD, PO-3, DS-13, 1924-H, 7890, XUT-31, and UF4S. Samples of these materials were obtained in sizes similar to those used in thermal conductivity and diffusivity apparatus. The experimental evaluation consisted of visual examination, density measurements, microstructural examination, heating tests simulating the environment and temperature cycling encountered in thermal property measurements, preliminary thermal conductivity measurements, and preliminary electrical resistivity measurements. Based upon the experimental results, aluminum oxide, thorium oxide, arc cast tungsten, and grades 1924-H (or AXM-5Q1) and RVD graphites were selected for the Phase II measurements program. (Author)
AD-657 024 HC$3.00 MF$0.65

CRYOGENIC HEAT PIPE.
Final technical rept.,
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio
W. L. Haskin. Jun 67, 61p Rept no. AFFDL-TR-66-228

Descriptors: (*Heat transfer, *Cryogenics), (*Pipes, Heat transfer), Two-phase flow, Evaporation, Condensation, Nitrogen, Vapor pressure, Gas flow, Instrumentation.
Identifiers: Heat pipes.

A heat pipe is a metal tube containing a two phase fluid to transport heat over several feet by evaporating liquid at the warm end and condensing the vapor at the cold end. An experimental heat pipe was constructed and instrumented to permit measurements of the heat transport in a nitrogen vapor tube wherein the vapor pressure and boundary temperatures could be monitored. No major effort was made to optimize the performance of the tube tested, but various designs and operating paramet-

ers were investigated experimentally to determine their effects on the thermal impedance of the tube. Heat loads of up to 130 watts were transferred axially in this 3/4-inch OD, 33-inch-long heat pipe with less than half the total temperature drop required by a copper rod of comparable size. The main temperature drops in the heat pipe are due to heat conduction through the tube wall and the fluid filled wick liner of the evaporator and condenser sections. When the tube surface temperatures were near the critical temperature of nitrogen, vapor film formation caused a large temperature drop. (Author)
AD-657 025 HC$3.00 MF$0.65

A STUDY OF THE HEAT GENERATION RATES AND TEMPERATURE DISTRIBUTION OF A PAIR OF BALL BEARINGS UNDER AXIAL LOAD.
Research and development rept.,
Naval Ship Research and Development Center Annapolis Md Annapolis Div
Joseph I. Schwartz. Aug 67, 129p
NSRDC-2458
Submitted to Drexel Inst. of Tech . Philadelphia, Pa. Dept. of Mechanical Engineering, in partial fulfillment of the requirements for the degree of Master of Science.

Descriptors: (*Bearings, *Heat), Loading (Mechanics), Thermal properties, Temperature control, Thermistors, Theory, Tests.

The thesis presents an analytical and experimental study of the thermal characteristics of light to moderately loaded ball bearings. Included are the results of a literature search, a theoretical analysis, and experimental results. A comparison between theory and experiment shows that the trends of the analytical prediction of heat generation rates and temperature distributions of an operating bearing is possible, however, the precision is of the order of 25% or worse. Other conclusions concerning the validity of the theory are discussed and recommendations for further work are presented. (Author)
AD-657 117 HC$3.00 MF$0.65

LUMINANCE, RADIANCE, AND TEMPERATURE.
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
For primary bibliographic entry see Field 20F.
AD-657 166 HC$3.00 MF$0.65

DER AERODYNAMISCHE WARMESCHUTZ BEIM HOCHGESCHWINDIGKEITSFLUG (Aerodynamic Heat Protection in High Velocity Flight),
Deutsche Versuchsanstalt Fuer Luft-Und Raumfahrt E V Freiburg-Im-Breisgau (West Germany)
For primary bibliographic entry see Field 20D.
AD-657 218 Not available from CFSTI.

NON-LINEAR HEAT TRANSFER BETWEEN TWO PARALLEL PLATES ACCORDING TO A MODEL WITH CORRECT PRANDTL NUMBER,
Applicazioni E Ricerche Scientifiche S P A Milan (Italy)
For primary bibliographic entry see Field 20D.
AD-657 235 Not available from CFSTI.

A COLLECTION OF SOME CONTROLLED SURFACE THERMAL ACCOMMODATION COEFFICIENT MEASUREMENTS,
Missouri Univ Columbia Physical Chemical Lab
For primary bibliographic entry see Field 20D.
AD-657 242 Not available from CFSTI.

KINETIC THEORY OF HEAT TRANSFER FOR A GAS WITH INTERNAL DEGREES OF FREEDOM,
Brown Univ Providence R I Div of Engineering
S. K. Hsu, and T. F. Morse. 1967, 23p
AFOSR-67-1935
Contract AF 49 (638)-1326
Availability: Published in Rarefied Gas Dynamics Symposium (5th) v1 p419-40 1967.

Descriptors: (*Heat transfer, Kinetic theory), (*Gases, *Kinetic theory), Thermal conductivity, Knudsen number, Equations, Temperature, Specific heat, Mathematical analysis.

Parallel plate heat transfer for a gas with internal degrees of freedom has been studied using a half range moment method. The collision integral of the Wang-Chang, Uhlenbeck equation is approximated by a relaxation model that depends upon inelastic as well as elastic relaxation times. The model gives the correct Prandtl, Schmidt, and Lewis numbers. Analytical solutions for a six moment approximation give the translational and internal temperature profiles as well as temperature jumps and heat transfer as functions of accommodation coefficients for internal and translational energy, specific heat due to internal degrees of freedom, Knudsen number, and ratio of elastic to inelastic collision time. Numerical solutions for a twelve moment approximation have been obtained for complete wall accommodation. (Author)
AD-657 273 Not available from CFSTI.

EFFECTS OF SOUND AND VIBRATIONS OF HEAT TRANSFER,
Brown Univ Providence R I
Peter D. Richardson. 1967, 21p
ARL-67-0128
Contract F33615-67-C-1754
Availability: Published in Applied Mechanics Reviews v20 n3 p201-17 Mar 1967.

Descriptors: (*Heat transfer, *Sound), (*Vibration, Heat transfer), Fluid mechanics, Convection (Heat transfer), Acoustic properties, Pressure, Velocity, Intensity.

The possibilities of using sound or vibrations to increase convective heat transfer rates have received much attention. Until recently, no analyses had been developed for the effects which have been found experimentally. The review begins with a discussion of some relevant acoustics and fluid mechanics, followed by an outline of the analysis of heat transfer by acoustic streaming, and its promising comparison with data for a circular cylinder, and, finally, a short account of other published results. (Author)
AD-657 281 Not available from CFSTI.

CALCULATION OF RADIANT FLUX IN A LAMINAR BOUNDARY LAYER,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 20D.
AD-657 372 HC$3.00 MF$0.65

DER AERODYNAMISCHE WAERMESCHUTZ VON FLUGKOERPERN UNTER BESONDERER BERUECKSICHTIGUNG DER ABLATIONSTECHNIK (Aerodynamic Heat Protection for Flight Vehicles with Special Consideration of Ablation Techniques),
Deutsche Versuchsanstalt Fuer Luft-Und Raumfahrt E V Freiburg-Im-Breisgau (West Germany)
For primary bibliographic entry see Field 20D.
AD-657 415 Not available from CFSTI.

CALORIMETRIC STUDY OF SEVERAL RARE-EARTH GALLIUM GARNETS,
Duke Univ Durham N C
For primary bibliographic entry see Field 8G.
AD-657 426 Not available from CFSTI.

HIGH-TEMPERATURE LIQUID-METAL TECHNOLOGY REVIEW. A BIMONTHLY TECHNICAL PROGRESS REVIEW.
Brookhaven National Lab., Upton, N. Y.
Feb 67, 62p
Descriptors: (*Liquid metals, *High-temperature research), (*Thermodynamics, *Reactor fuel elements), Heat transfer, Sodium, Reactor coolants.

For abstract, see NSA 21 16.
BNL-50048 HC$3.00 MF$0.65

NUMERICAL TREATMENT OF A THIN PLATE HEAT TRANSFER PROBLEM,
Oak Ridge Gaseous Diffusion Plant, Tenn.
For primary bibliographic entry see Field 13H.
For abstract, see NSA 21 16.
K-1695 HC$3.00 MF$0.65

INVERSE PROBLEMS IN RADIATIVE TRANSFER - A REVIEW.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
B. J. Conrath. Feb 67, 35p NASA-TM-X-55857, X-622-67-57

Descriptors: *Infrared radiation, *Inversion, *Planetary atmosphere, *Radiation transfer, Application, Data, Distribution, Earth, Linear, Measurement, Problem, Profile, Remote, Solution, Temperature, Vapor, Vertical, Water.

For abstract, see STAR 05 19.
N67-32849 HC$3.00 MF$0.65

VAPORIZATION OF HIGH-TEMPERATURE POTASSIUM IN FORCED CONVECTION AT SATURATION TEMPERATURES OF 1800 DEG TO 2100 DEG F.
General Electric Co., Cincinnati, Ohio. Missile and Space Div.
J. A. Bond, and G. L. Converse. Jul 67, 258p
NASA-CR-843
Contract NAS3-2528

Descriptors: *Forced convection, *Heat transfer, *High temperature fluid, *Liquid flow, *Potassium, *Vaporization, Boiling, Convection, Film, Flow, Fluid, Flux, Forced, Heat, High temperature, Liquid, Nucleate, Power, Radiance, Rankine cycle, Saturation, Space, Superheating, Temperature, Transition, Tube.

For abstract, see STAR 05 19.
N67-33147 HC$3.00 MF$0.65

HEAT TRANSFER IN A PLANE INCOMPRESSIBLE LAMINAR JET.
Florida Univ., Gainesville. Dept. of Aerospace Engineering.
For primary bibliographic entry see Field 20D.
For abstract, see STAR 05 19.
N67-33396 HC$3.00 MF$0.65

LOW TEMPERATURE SPECIFIC HEAT OF CARBIDES V2C, NB2 C, MO2 C, AND V MO C.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 20L.
For abstract, see STAR 05 19.
N67-33425 HC$3.00 MF$0.65

ELECTRONIC SPECIFIC HEATS AT LOW TEMPERATURE OF TANTALUM HYDROGEN COMPOUNDS.
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 20L.
For abstract, see STAR 05 19.
N67-33426 HC$3.00 MF$0.65

EFFECT OF SUBCOOLING AND RADIATION ON FILM-BOILING HEAT TRANSFER FROM A FLAT PLATE.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
K. J. Baumeister, and T. D. Hamill. Aug 67, 41p
NASA-TN-D-3925

Descriptors: *Film boiling, *Flat plate, *Heat transfer, *Radiation effect, *Subcooling, Boiling, Bulk, Coefficient, Convection, Effect, Film, Flat, Formula, Free, Liquid, Plate, Radiation, Saturation, Temperature, Wall.

For abstract, see STAR 05 19.
N67-33442 HC$3.00 MF$0.65

CALCULATION OF STEAM VOLUME FRACTION IN SUBCOOLED BOILING.
Aktiebolaget Atomenergi, Stockholm (Sweden).
S. Z. Rouhani. Jun 67, 32p AE-286

Descriptors: *Boiling, *Steam, *Subcooling, *Void fraction, Bubble, Calculation, Equation, Flux, Fraction, Heat transfer, Liquid, Mass, Physical, Property, Velocity, Void, Volume.

For abstract, see STAR 05 19.
N67-33537 HC$3.00 MF$0.65

APPLICATION OF GEBHART'S METHOD TO THE COMPUTATION OF RADIATIVE EXCHANGES INSIDE AN ENVIRONMENTAL CHAMBER.
European Space Technology Center, Noordwijk (Netherlands).
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 19.
N67-33643 HC$3.00 MF$0.65

20N. Wave Propagation

WAVE PROPAGATION ALONG PERIODIC STRUCTURES AND PLASMA SLABS.
Final scientific rept. 1 Oct 64-30 Apr 67,
Leeds Univ (England) Dept of Electrical and Electronic Engineering
Joshua S. L. Wong, and Peter J. B. Clarricoats.
1 May 67, 52p Rept no. LU/EE/67/05
AFCRL-67-0441
Contract AF 61 (052)-783

Descriptors: (*Waveguides, Wave transmission), (*Plasma medium, Wave transmission), Delay lines, Propagation, Ferrites, Rods, Dielectrics, Microwaves, Great Britain.

Guided electromagnetic wave propagation along two distinctly different structures has been studied. Structure A consists of a disc-loaded dielectric rod with or without a centre conductor. The main objective is to evaluate its use as a microwave delay-line for pulse compression. Expressions for the dispersion equations, power flow and attenuation coefficient are derived and numerical results of group-delay, propagation and attenuation coefficient as a function of signal frequency are presented for a range of values of the parameters. The problem of determining a set of parameters which will give rise to a prescribed propagation characteristic, in particular that giving linear 'group delay vs frequency' has been solved numerically using an optimization procedure. Structure B consists of a plasma slab backed by a conducting plane with or without an ion sheath between them. The constraints usually applied to this model of zero loss, zero electron temperature and no ion sheath are relaxed one at a time, and dispersion curves with one or more constraints relaxed are presented. This procedure is deemed necessary to aid interpretation of experiments on laboratory or 'actual' plasmas which are not definable by a single idealized model. The theoretical formulation of the problem is such that extension to more complicated plasma-slab configurations can be readily made. (Author)
AD-656 787 HC$3.00 MF$0.65

SULLA PROPAGAZIONE DELLE ONDE ELECTROMAGNETICHE NELLE TROMBE A SETTORE (Propagation of Electromagnetic Waves in a Sectoral Horn),
Politecnico Di Milano (Italy) Istituto Di Matematica
Anna Marisa Merri Manarini. 20 Jan 66, 29p
Rept no. Pub-428
Text in Italian.
Availability: Published in Rendiconti dell' Istituto Lombardo di Scienze e Lettere v100 246-72 1966.

Descriptors: (*Electromagnetic waves, Wave transmission), Mathematical analysis.
Identifiers: Sectoral electromagnetic horn.
AD-656 838 Not available from CFSTI.

TABLES OF SPHEROIDAL WAVE FUNCTIONS. PART 3. SECOND VOLUME OF OBLATE RADIAL FUNCTIONS OF THE FIRST AND SECOND TYPE,
Naval Research Lab Washington D C
For primary bibliographic entry see Field 12A.
AD-656 898 HC$3.00 MF$0.65

INTERPRETATION OF THE STATISTICS OF OCCURRENCE OF ALOUETTE I EARTH ECHOES,
Defence Research Telecommunications Establishment Ottawa (Ontario) Radio Physics Lab
D. B. Muldrew, M. D. Litwack, and P. L. Timleck. 21 Oct 66, 10p
Availability: Published in Planet Space Science v15 p611-8 1967.

Descriptors: (*Electromagnetic wave reflections, Scientific satellites), (*Ionospheric propagation, High frequency), Terrestrial magnetism, Attenuation, Wave transmission, Noise (Radio), Radio waves.
Identifiers: Alouette I, Earth echoes, Ionograms.

The strength of Earth echoes on Alouette I ionograms, tabulated in Alouette I booklets (ALOSYN), is used to produce contours of the percentage occurrence of Earth echoes on polar projection maps of the Earth. These maps can be used to show the relative noise level over much of the ocean area of the Earth. In general, a very low percentage occurrence of Earth echoes correspond to regions of high radio noise level due to thunderstorm activity and to h.f. radio wave interference. An unusually low percentage occurrence of Earth echoes is observed over Greenland suggesting that the radio waves are absorbed in the thick ice sheet. An extremely high percentage occurrence of Earth echoes near the north magnetic dip pole can be explained by the collimating or focussing effect of field-aligned ionization irregularities in the ionosphere. There is some indication that sea is a better reflector of radio waves than land. (Author)
AD-656 945 Not available from CFSTI.

HISTORICAL ANALYSIS OF ELECTROMAGNETIC INTERFERENCE LIMITS,
Aerospace Corp El Segundo Calif Technical Operations
C. B. Pearlston, Jr. Apr 67, 49p Rept no. TR-1001 (2307)-12
SSD-TR-67-127
Contract AF 04 (695)-1001

Descriptors: (*Radiofrequency interference, Electromagnetic compatibility), (*Electromagnetic compatibility, Military requirements), Standards, Interference, Specifications, Low frequency, High frequency, Reviews.

Limits currently used by military specifications for control of Electromagnetic interference and susceptibility are uniformly based on tests which were conducted many years ago on aircraft voice communication equipment in typical aircraft installations, and do not necessarily relate to present requirements of space systems. This paper examines the development of interference and susceptibility limits in various military specifications indicating the technique by which the limits were derived, the rationale for such derivation, and the changes in various limits with time since their original formulation. It also discusses certain inconsistencies within and between the limits of the various specifications. The evaluation of the status of this field practically dictates that a study should be initiated to realistically formulate a theoretically and empirically valid set of interference and susceptibility limits to fit the needs of modern, complex systems in crowded, electromagnetic environments. (Author)
AD-657 014 HC$3.00 MF$0.65

AURORAL-ZONE GEOPHYSICAL EVENTS AND THEIR RELATIONSHIP TO THE MAGNETOSPHERE,
Stanford Univ Calif
For primary bibliographic entry see Field 4A.
AD-657 065 Not available from CFSTI.

NATURE AND OPTIMISATION OF THE GROUND (LATERAL) WAVE EXCITED BY SUBMERGED ANTENNAS.
Polytechnic Inst of Brooklyn N Y Dept of Electrophysics
For primary bibliographic entry see Field 9E.
AD-657 090 Not available from CFSTI.

A STUDY OF THE MECHANISM OF SEA SURFACE SCATTERING.
Revised ed.,
Polytechnic Inst of Brooklyn N Y Dept of Electrophysics
J. D. DeLorenzo, and E. S. Cassedy. 4 Apr 66, 12p
AFOSR-67-1861
Contract AF 49 (638)-1402
Revision of manuscript 16 Dec 65. Doctoral thesis.
Availability: Published in IEEE Transactions on Propagation vAP-14 n5 p611-20 Sep 1966.

Descriptors: (*Electromagnetic waves, Coherent scattering), (*Ocean waves, Surface properties), Diffraction, Power spectra, Band-pass filters, Statistical processes, Bandwidth, Reflection.

The mechanism by which electromagnetic waves are scattered from the sea surface is studied herein. Principal applications for such studies occur in over-water communication channels and radar. Predictions based on rigorous formulations for diffraction from a (moving) time-space periodic surface are correlated with the experimental results of other authors. Such predictions explain the existence of strong coherent scattering from the sea surface in non-specular directions (grating lobes) and also anticipate the appearance of well-defined, harmonically related, frequency shifts (time-space harmonics) in scattered signals observed in these experiments. On the basis of such manifestations of the periodic nature of the sea surface, a model is formulated for use in calculation of the angular power spectrum of scattered electromagnetic waves. This model, accounting for spatial coherence effects, assumes for the fluctuation of heights on the water surface a Gaussian distribution with a narrow band-pass (nearly sinusoidal) spatial spectrum. Calculations of the angular, scattered spectrum due to this model show strong predominantly coherent wave summation in directions corresponding precisely to the grating lobes of a purely periodic structure of period equal to the center period of the band-pass spectrum. Spectral (angular) spreading increases with increased bandwidth of the spatial spectrum of the surface. Calculations for the present study are made on the basis of a perfectly reflecting boundary and hence do not display the proper distinction of polarization expected for a completely realistic model. (Author)
AD-657 093 Not available from CFSTI.

A STATISTICAL MODEL FOR FORWARD SCATTERING OF WAVES OFF A ROUGH SURFACE,

Johns Hopkins Univ Silver Spring Md Applied Physics Lab
L. M. Spetner. 15 Feb 67, 31p Rept no. CF-2533
Contract NOrd-7386

Descriptors: (*Electromagnetic waves, Scattering), (*Scattering, Surface properties), Surface roughness, Mathematical models, Signals, Microwaves, Oceans.

Using methods of physical optics, a statistical description of the scattering of waves off a rough surface is obtained. The rough surface is assumed to consist of a large number of independent point scatterers which fluctuate randomly in vertical position and also disappear and appear at random. The surface is divided into cells so that no more than one scatterer can occupy a cell, and the events in any two different cells are independent of each other. The average scattered signal, the mean square fluctuation, and the time covariance of the fluctuating portion of the signal are computed in terms of the mean square scatterer height, the grazing angle, the radiation wavelength, the decay time for disappearance of scatterers, the time autocorrelation of a scatterer height, and the a priori probability of finding a given cell occupied by a scatterer. (Author)
AD-657 109 HC$3.00 MF$0.65

COMPARISON OF PREDICTIONS OF VECTOR MODEL OF MICROWAVE REFLECTION FROM THE OCEAN WITH EXPERIMENTAL RESULTS,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
C. I. Beard, and F. E. Brooks, Jr. 18 Jun 56, 37p
Rept no. CF-2526
Contract NOrd-7386
Prepared in cooperation with Texas Univ., Austin, Electrical Engineering Research Lab.

Descriptors: (*Electromagnetic wave reflections, Ocean waves), (*Microwaves, Reflection), Theory, Mathematical prediction, Mathematical models, Vector analysis, Graphics.

The Vector Model of microwave reflection from the ocean was extended to predict total signal fluctuations at minima in the interference pattern, as well as maxima, and to predict the shapes of the probability distributions as a function of h psi/lambda. For these predictions one requires h psi, and lambda for the roughness parameter, h psi/lambda, and the polarization of the radiation. A knowledge of the antenna pattern is of course required. The treatment applies to line of sight propagation. A comparison of the theory to experimental results obtained by the Electrical Engineering Research Laboratory of The University of Texas in 1955 at the Gulf of Mexico is given. (Author)
AD-657 112 HC$3.00 MF$0.65

EFFECT OF OFF-PATH IONOSPHERIC REFLECTIONS ON VLF RADIO WAVES.
Rept. for Jan 66-Apr 67,
Navy Electronics Lab San Diego Calif
E. E. Gossard, and M. R. Paulson. 14 Jun 67, 44p
Rept no. NEL-1467

Descriptors: (*Ionosphere, Radio waves), (*Radio waves, Reflection), Wave transmission, Very low frequency, Low frequency, Phase shift, Attenuation, Doppler effect, Atmospheric motion.

Describes a technique for analyzing movements in the lower ionosphere. The technique uses a ground based very-low-frequency radio transmitting and receiving system. The experimental results show that off-path reflections in the irregular ionosphere are much more important than hitherto believed, and that movement of discrete reflectors in the ionosphere causes Doppler frequency shifts that have an important effect on the phase and amplitude fluctuations of reflected radio waves. (Author)
AD-657 172 HC$3.00 MF$0.65

THE GENERATION OF THERMOELASTIC STRESS WAVES BY IMPULSIVE ELECTROMAGNETIC RADIATION.
Technical rept.,
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
L. W. Morland. Jul 67, 31p Rept no. TR-11
Contract N00014-67-A-0109-0003

Descriptors: (*Electromagnetic waves, Absorption), (*Stresses, Electromagnetic waves), Surface properties, Interactions, Heat transfer, Elasticity, Electromagnetic pulses, Lasers, Mathematical analysis, Boundary value problems, Solids.

The absorption of electromagnetic radiation within a thin, but finite, surface layer of an elastic half-space provides a sudden heat source distribution through the layer, and stress waves are generated. A solution for uni-axial motion is given in the limit situation when the pulse duration approaches zero in comparison with the wave travel time through the layer, together with the neglect of thermal diffusion on this time scale. The radiation absorption is assumed to decay exponentially with depth. These simplifying features lead to stress wave profiles which clearly illustrate the effective nature of the solution. In the case when the surface is stress free, after the initial build-up (here instantaneous) of compressive stress within the layer, a tensile wave propagates out of the layer. Numerical data are presented to show that the peak tensile stress can attain significant levels within a few layer thicknesses of the surface. (Author)
AD-657 181 HC$3.00 MF$0.65

PROPAGATION OF FINITE AMPLITUDE IN SINGLE CRYSTALS OF HIGH-PURITY ALUMINUM.
Revised ed.,
Johns Hopkins Univ Baltimore Md
William J. Gillich. 25 Oct 66, 15p
AFOSR-67-1939
Contract AF 49 (638)-1715
Revision of manuscript received 14 Apr 66.
Availability: Published in Philosophical Magazine v15 n136 p659-70 Apr 1967.

Descriptors: (*Single crystals, *Deformation), (*Shock waves, Propagation), Aluminum, Compressive properties, Stresses, X-ray diffraction analysis, Strain gages, Pressure, Tensile properties, Equations, Tables, Temperature, Captive tests.

The paper presents conclusions concerning uniaxial deformations of single crystals. The dynamic deformations obtained from an experimental study of large amplitude compression waves in high-purity crystals of aluminum were shown to agree with the finite amplitude wave theory. It was also demonstrated that the aggregate theory of G. I. Taylor could be used to predict the same dynamic deformations of the single crystal study on the basis of the static compressive columnar multi-crystal and the static tensile polycrystalline deformation curves. The predominant deformation predicted from the static data was discovered to have a quadric temperature dependence. (Author)
AD-657 276 Not available from CFSTI.

A MICROWAVE SYSTEM FOR DETERMINING ELECTRON DENSITY AND COLLISION FREQUENCY IN AN IONIZED GAS,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 20I.
AD-657 296 HC$3.00 MF$0.65

COOPERATIVE SCATTERING BY DIELECTRIC SPHERES.
Technical note,
Massachusetts Inst of Tech Lexington Lincoln Lab
Robert K. Crane. 6 Jul 67, 66p Rept no. TN-1967-31
ESD-TR-67-326
Contract AF 19 (628)-5167

Descriptors: (*Electromagnetic waves, Scattering), Spheres, Dielectrics, Boundary value problems, Propagation.

The problem of scattering of electromagnetic waves by a small number of closely spaced dielectric spheres is considered as a boundary value problem. The solution to this problem is obtained in a series form using partial spherical vector waves. An approximate solution is also obtained for spheres separated sufficiently far for waves scattered by one sphere and incident on another to be considered plane waves with an amplitude given by the solution to the single scattering problem. The use of both solutions is discussed. (Author)
AD-657 328 HC$3.00 MF$0.65

RESEARCH INTO THE SCATTERING OF ELECTROMAGNETIC ENERGY FROM HIGHLY CONDUCTING BODIES.
Final rept. 1 Mar 64-28 Feb 67,
Ohio State Univ Columbus Electroscience Lab
E. M. Kennaugh, D. L. Moffatt, and R. C. Schafer.
24 May 67, 56p
AFCRL-67-0329
Contract AF 19 (628)-4002

Descriptors: (*Electromagnetic waves, *Scattering), Theory, Electromagnetic fields, Illumination, Response, Transients, Reflection, Measurement, Approximation (Mathematics), Frequency.

The report summarizes research during the period March 1, 1964, to March 1, 1967, under Contract AF 19 (628)-4002, on the subject: Scattering of Electromagnetic Energy from Highly Conducting Bodies. The purpose of this research is to improve theoretical methods for the analysis of scattering problems involving arbitrary transient electromagnetic fields and to apply such methods to specific scattering shapes. The report is contained in three sections. In Section I, the transient response of finite bodies at great distances is discussed. An incident plane electromagnetic wave of impulse, step, or ramp function time-dependence is incident upon an object, and the time-dependent waveforms scattered in various directions are of interest. The approximation of these waveforms by several methods is considered, as well as the interpretation and further uses of the waveforms, when determined. Section II is concerned with the near-zone behavior of the transient electromagnetic fields for the same forms of plane wave illumination. Theoretical techniques for approximating the waveforms associated with particular components of the electromagnetic field on the surface of a conducting scatterer are investigated and compared with exact or numerical solutions in specific cases. Section III discusses experimental techniques for investigating the scattering of transient plane waves by objects. In particular, the use of continuous-wave reflection-measuring systems at a number of harmonically related frequencies to estimate the ramp response waveform of simple objects is considered. (Author)
AD-657 356 HC$3.00 MF$0.65

TRANSIENT RESPONSE OF AN ELASTIC SHELL IN PLANE STRAIN,
Northwestern Univ Evanston Ill Dept of Civil Engineering
L. M. Keer, J. F. Fleming, and G. Herrmann.
1967, 15p
AFOSR-67-1908
Grant AF-AFOSR-100-66
Prepared for presentation at the ASCE Structural Engineering Conference 2 Feb 1966, Miami, Fla.
Availability: Published in The Acoustical Society of America v41 n2 p358-68 Feb 1967.

Descriptors: (*Dynamics, *Elastic shells), (*Propagation, *Mechanical waves), Flexural strength, Stresses, Bending, Equations of motion, Integral transforms, Acoustics.

The dynamic response of a circular, elastic shell in plane strain, when given an impulsive radial load, is studied. Inextensional bending is assumed and approximate solutions are obtained for the behavior at the wavefronts and for some time after the wave has passed. The method of Friedlander as applied by Payton to shells is used to study the wave propagation for relatively long times, and the bending-moment distribution is obtained. (Author)
AD-657 427 Not available from CFSTI.

DISPERSION OF FREE HARMONIC WAVES IN FIBER-REINFORCED COMPOSITES.
Technical rept.,
Northwestern Univ Evanston Ill Structural Mechanics Lab
Jan D. Achenbach, and George Herrmann. Jun 67, 26p Rept no. TR-67-3
Contract Nonr-1228 (34)

Descriptors: (*Mechanical waves, *Composite materials), Deformation, Kinetic energy, Equations of motion, Scattering, Elasticity, Theory, Fibers, Propagation, Dynamics, Reinforcing materials.

A set of displacement equations of motion is proposed that is suitable for the dynamic analysis of fiber-reinforced composites. In deriving the equations, representative elastic moduli are used for the binder, and the elastic and geometric properties of the fibers are combined into effective stiffnesses. With the aid of certain assumptions regarding the deformation of the fibers, and by employing a smoothing operation, approximate kinetic and strain energy densities for the fiber-reinforced composite are obtained. Application of Hamilton's principle yields the displacement equations of motion. The proposed set of equations is employed to study the propagation of plane harmonic waves propagating in the direction of the fibers and normal to the fiber direction. Plane transverse waves propagating in the direction of the fibers are dispersive, and dispersion curves are shown. By proper choice of the representative elastic moduli of the binder, the phase velocity at infinite wave length for transverse waves propagating in the direction of the fibers, and the constant phase velocities for longitudinal waves and waves propagating in the other directions, agree with the values predicted by the effective modulus theory. (Author)
AD-657 461 HC$3.00 MF$0.65

EXPERIMENTAL OBSERVATION OF NON-LINEAR COUPLING BETWEEN SLOW AND FAST WAVES IN A PLASMA WAVEGUIDE.
Royal Inst. of Tech., Stockholm (Sweden). Microwave Dept.
P. Hedvall. 23 Feb 67, 15p SR-17, RADC-TR-67-323
Contract AF 61/052/-895

Descriptors: *Coupling network, *Nonlinear system, *Waveguide, Cavity, Circular, Coupling, Excitation, Network, Nonlinear, Propagation, Pump, Resonator, System, Wave.

For abstract, see STAR 05 19.
N67-32762 HC$3.00 MF$0.65

THE JOINT SATELLITE STUDIES GROUP.
Paris Univ. (France).
For primary bibliographic entry see Field 4A.
For abstract, see STAR 05 19.
N67-32982 HC$3.00 MF$0.65

21. PROPULSION AND FUELS

21B. Combustion and Ignition

WATER COOLING COMBUSTION GASES FOR CUBICLE 3 EXHAUST CHAMBER,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 14B.
AD-656 884 HC$3.00 MF$0.65

IONIZING DETONATION WAVES IN TRANSVERSE ELECTROMAGNETIC FIELDS,
Strathclyde Univ Glasgow (Scotland) Dept of Mathematics
For primary bibliographic entry see Field 20I.
AD-657 049 Not available from CFSTI.

THEORETICAL COMBUSTION PERFORMANCE OF RAMJET FUELS: HYDROGEN,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 21D.
AD-657 150 HC$3.00 MF$0.65

THEORETICAL COMBUSTION PERFORMANCE OF RAMJET FUELS: PROPANE,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 21D.
AD-657 152 HC$3.00 MF$0.65

INVESTIGATION OF THE FLAME STRUCTURE OF A THERMALLY UNSTABLE FUEL FINAL REPORT.
Dynamic Science Corp., Monrovia, Calif.
B. P. Breen, S. Hersh, R. J. Hoffman, and B. R. Lawver. 30 Jun 67, 42p NASA-CR-72261, DS-SN81B
Contract NAS7-442

Descriptors: *Burning rate, *Hydrazine, *Nitrogen compound, *Thermal instability, Burn, Compound, Concentration, Conductivity, Decomposition, Flame, Fuel, Instability, Liquid, Nitrogen, Phase, Physical, Probe, Property, Rate, Structure, Temperature, Tetroxide, Thermal, Vapor.

For abstract, see STAR 05 19.
N67-33449 HC$3.00 MF$0.65

21D. Fuels

THEORETICAL COMBUSTION PERFORMANCE OF RAMJET FUELS: HYDROGEN,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Waldo T. Renich. 13 Dec 56, 12p Rept no. CF-2601
Contract NOrd-7386

Descriptors: (*Jet engine fuels, Hydrogen), (*Hydrogen, *Combustion), Flames, Temperature, Specific impulse, Molecular weight, Specific heat, Combustion products, Ramjet engines.

The report is the first of a series prepared as a compilation of available data on theoretical combustion performance of various fuels. The performance parameters to be given primary consideration are flame temperature and air specific impulse; others, including fuel specific impulse, mole change and expansion ratio are also included.
AD-657 150 HC$3.00 MF$0.65

THEORETICAL COMBUSTION PERFORMANCE OF RAMJET FUELS: PROPANE,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
W. T. Renich. 19 Dec 56, 12p Rept no. CF-2609
Contract NOrd-7386

Descriptors: (*Jet engine fuels, Propanes), (*Propanes, *Combustion), Flames, Temperature, Specific impulse, Combustion products, Specific heat, Molecular weight, Ramjet engines.

The report, the second of a series on the theoretical combustion performance of ramjet fuels (see also AD-657 150), presents some performance parameters for propane. Included is the flame temperature, air specific impulse, fuel weight specific impulse, fuel volume specific impulse, average molecular weight and ratio of specific heats of combustion products, and expansion ratio for propane burned in air at various conditions of pressure and inlet temperature.
AD-657 152 HC$3.00 MF$0.65

FLAMMABILITY PROPERTIES OF HYDROCARBON FUELS. PART 2. THE IMPORTANCE OF VOLATILE COMPONENTS AT LOW CONCENTRATION ON THE FLAMMABILITY OF LIQUID FUELS,
Naval Research Lab Washington D C
Wilbur A. Affens. 10 Jul 67, 22p Rept no. NRL-6578
See also AD-616 985.

Descriptors: (*Hydrocarbons, Flammability), (*Jet engine fuels, Flammability), (*Fuel oil, Flammability), Vapors, Concentration (Chemistry), Vapor pressure, Alkanes.

It was demonstrated by a simplified treatment that vapor pressures of individual constituents play a more important role than concentration on the overall flammability properties of hydrocarbon mixtures. This treatment is based on the application of Raoult's and Dalton's laws governing vapor pressure and composition above a solution of two or more liquid hydrocarbons to Le Chatelier's rule governing the flammability of vapor mixtures. The most important conclusion demonstrated by the derived equations is that a very small amount of highly volatile contaminant in a relatively nonflammable fuel may make it flammable. The amounts needed can be predicted from the equations and the properties of the components. Although precise relationships have been derived only for relatively simple solutions of pure hydrocarbons, the concepts they imply are applicable to more complex mixtures such as jet and diesel fuels. The flammability properties included in this study are lower and upper flammability limits, flash points, and flammability indices of liquid solutions. (Author)
AD-657 455 HC$3.00 MF$0.65

21F. Nuclear Propulsion

HEAT AND MASS-TRANSFER CHARACTERISTICS OF AN AXIAL-FLOW LIQUID-CORE NUCLEAR ROCKET EMPLOYING RADIATION HEAT TRANSFER.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
L. F. Donovan, A. F. Kascak, and R. G. Ragsdale. Aug 67, 48p NASA-TN-D-4127
Contract 122-28-02-18-22

Descriptors: *Mass transfer, *Nuclear engine for rocket vehicle (nerva), *Radiative heat transfer, Calculation, Carbide, Characteristics, Core, Flow, Fuel, Heat transfer, Hydrogen, Liquid, Mass, Niobium, Nuclear, Propellant, Radiation, Rate, Rocket, Rocket engine, Solvent, Surface, Temperature, Transfer, Uranium, Vehicle, Zirconium.

For abstract, see STAR 05 19.
N67-33877 HC$3.00 MF$0.65

21G. Reciprocating Engines

DEVELOPMENT OF AN INTERNAL-COMBUSTION ENGINE FUELED WITH CRYOGENIC HYDROGEN AND OXYGEN,
Air Force Aero Propulsion Lab Wright-Patterson AFB Ohio
Richard E. Quigley, Jr. 17 Jul 67, 32p Rept no. AFAPL-Conf-68-1
Prepared for presentation at AIII Propulsion Specialist Conference (3rd) 17-21 Jul 1967, Washington, D. C.

Descriptors: (*Internal combustion engines, Spaceborne), Hydrogen, Oxygen, Fuels, Cryogenics, Carburetors, Fuel tanks, Performance (Engineering), Weight, Cryopumping, Liquefied gases, Fuel pumps, Fuel injectors, Fuel systems, Efficiency.

The practicability of utilizing a hydrogen-oxygen-fueled, internal-combustion engine in conjunction with low-pressure cryogenic tanks was determined through an experimental investigation conducted at the Air Force Aero Propulsion Laboratory. This experimental investigation incorporated subcritical tankage with a low-flow cryogenic pump, an internal-combustion power-generating unit, and associated control instrumentation. The development effort concentrated on the improvement of the endurance capabilities of the carbureted hydrogen-oxygen, internal-combustion engine. Specific performance data on all components tested are presented. One of the principal results of the investigation is the recommended use of subcooled liquid hydrogen in the cryogenic pumping system. However, further development effort on both the pumping system and the power generation are necessary before these components can be integrated successfully. (Author)
AD-657 286 HC$3.00 MF$0.65

21H. Rocket Motors and Engines

PYROLTIC CARBIDE DEVELOPMENT PROGRAM.
High Temperature Materials Inc Boston Mass
For primary bibliographic entry see Field 11B.
AD-657 188 HC$3.00 MF$0.65

PYROLYTIC CARBIDE DEVELOPMENT PROGRAM.
High Temperature Materials Inc Boston Mass
For primary bibliographic entry see Field 11B.
AD-657 189 HC$3.00 MF$0.65

EFFECT OF ELASTIC CASE ON STABILITY OF RADIAL MODES IN SOLID PROPELLANT ROCKETS.
Revised ed.,
Northwestern Univ Evanston Ill
J. D. Achenbach, and C. T. Sun. 1 Nov 66, 7p
Contract Nonr-1228 (34)
Revision of manuscript submitted 26 Jul 66. Presented at the AIAA Aerospace Sciences Meeting (4th), Los Angeles, Calif., 27-29 Jun 66, as Preprint 66-473.

Availability: Published in Journal of Spacecraft and Rockets v4 n2 p214-9 Feb 1967.

Descriptors: (*Rocket motors (Solid propellant), Stability), (*Rocket cases, Elasticity), Combustion, Vibration, Acoustics, Thickness.

The coupling of the combustion process and the mechanical vibrations of a solid propellant rocket may result in acoustic instability if a mechanical disturbance is amplified by energy release in the combustion zone. Acoustic stability depends on the balance of energy sources and energy sinks. Energy dissipations in the gas and the viscoelastic solid propellant binder are taken into account. The instantaneous frequencies of the structural system are determined from the undamped system. The influence of relative thickness of the elastic case on acoustic stability of the lowest radial mode is discussed. It is found that in the early part of the burning process a thicker case makes a more stable motor. Near burnout, however, the motor becomes more stable for a thinner case. (Author)
AD-657 494 Not available from CFSTI.

HELIUM PRESSURANT REQUIREMENTS FOR LIQUID- HYDROGEN EXPULSION USING SUBMERGED GAS INJECTION.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
W. R. Johnson. Aug 67, 47p NASA-TN-D-4102
Contract 180-31-02-01-22

Descriptors: *Expulsion, *Gas injection, *Helium, *Liquid hydrogen, *Working fluid, Cold gas, Diffusion, Fluid, Gas, Hot gas, Hydrogen, Injection, Liquid, Pressurization, Propellant, Saturation, Submerged, System, Table, Ullage, Vaporization, Volume, Working.

For abstract, see STAR 05 19.
N67-33441 HC$3.00 MF$0.65

21I. Rocket Propellants

METHYL CELLULOSE NITRATE.
Picatinny Arsenal Dover N J Propellants Lab
For primary bibliographic entry see Field 7C.
AD-657 214 HC$3.00 MF$0.65

PRESSURE DEPENDENCE OF NONMETALIZED HYBRID FUEL REGRESSION RATES.
Revised ed.,
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
F. J. Kosdon, and F. A. Williams. 31 Oct 66, 7p
AFOSR-67-1902
Grant AF-AFOSR-927-65
Revision of manuscript submitted 8 Aug 66.
Availability: Published in AIAA Journal v5 n4 p774-8 Apr 1967.

Descriptors: (*Hybrid rocket propellants, Combustion), Burning rate, Fuel consumption, Pressure, Chemical reactions, Fluid flow, Reaction kinetics.

Theoretical interpretations are reviewed and discussed for recent experimental observations on the pressure dependence of nonmetalized hybrid fuel regression rates. It is emphasized that regression rate data alone are not likely to be capable of demonstrating whether the major heat-release reactions are heterogeneous or homogeneous. A method for plotting experimental data is suggested which, in principle, can distinguish between rival qualitative homogeneous-reaction theories, one of which is developed herein. It is shown that existing data are not sufficiently accurate to distinguish between alternative homogeneous-reaction hypotheses, and the need (and feasibility) of developing an accurate homogeneous-reaction theory that describes small departures from pressure independence is underscored. On the basis of an approximate homogeneous-reaction analysis of large departures from pressure independence (which shows that the regression rate varies as the square root of the pressure if it is assumed that the fuel concentration at the wall is independent of pressure), it is concluded that many difficulties will arise in attempts to predict theoretical values for homogeneously controlled regression rates in the strongly pressure-dependent regime. (Author)
AD-657 410 Not available from CFSTI.

22. SPACE TECHNOLOGY

22A. Astronautics

SPACE ENVIRONMENTAL EFFECTS ON MATERIALS AND COMPONENTS, VOLUME I. ELASTOMERIC AND PLASTIC MATERIALS. APPENDIX A THROUGH I,
Battelle Memorial Inst Columbus Ohio
For primary bibliographic entry see Field 11I.
AD-656 925 HC$3.00 MF$0.65

ULTRAVIOLET CALIBRATION PROCEDURES FOR GEMINI EXPERIMENT M-407.
National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.
For primary bibliographic entry see Field 3B.
For abstract, see STAR 05 19.
N67-33422 HC$3.00 MF$0.65

MICROMETEORITE STUDIES AT THE MAX-PLANCK- INSTITUT FUER KERNPHYSIK, HEIDELBERG INTERIM REPORT.
Max-planck-institut Fuer Kernphysik, Heidelberg (West Germany).
K. Sitte. Apr 67, 38p ESRO-SN-18

Descriptors: *Impact damage, *Micrometeorite, *Microparticle, *Sounding rocket, Analysis, Collection, Crater, Damage, Detection, Dust, Flight, Flux, Impact, Particle, Rocket, Simulation, Sounding, Target.

For abstract, see STAR 05 19.
N67-33647 HC$3.00 MF$0.65

22B. Spacecraft

THE TWO-STAGE SOUNDING-ROCKET PROBLEM,
Rand Corp Santa Monica Calif
Russell D. Shaver. Aug 67, 36p Rept no. P-3490

Descriptors: (*Sounding rockets, Thrust), (*Thrust, Optimization), Rocket motors, Staging, Equations of motion, Rocket trajectories, Control.

The paper addresses the problem of determining the appropriate history of the thrust of a rocket engine that produces maximum altitudes for a two-stage-rocket launch vehicle. Simplifying assumptions, for example, that the earth is flat, have been made and rules for optimal thrust arcs have been derived. Effects of changes in vehicle characteristics at staging, including the vehicle drag coefficient and the rocket engine characteristics, are investigated. Significant alterations from previously analyzed single-stage sounding-rocket trajectories are possible. The occurrences of intermediate coasting arcs, intermediate variable-thrust arcs, and up to five control switches are all characteristics unique to the two-stage problem. Although these differences will be minimized by the inclusion of realistic atmospheric drag profiles, they will probably exist if the lift-off acceleration of the sounding rocket is high. (Author)
AD-657 003 HC$3.00 MF$0.65

SATELLITE POSITION AND VELOCITY PERTURBATIONS DUE TO ERRORS AT INJECTION.
Air Force Missile Development Center Holloman AFB N Mex
For primary bibliographic entry see Field 17G.
AD-657 028 HC$3.00 MF$0.65

EVALUATION OF THE NAVY NAVIGATION SATELLITE SYSTEM AND THE OMEGA NAVIGATION SYSTEM.
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 17G.
AD-657 124 HC$3.00 MF$0.65

A PRACTICAL SOLUTION TO THE PROBLEM OF THERMAL BENDING IN SPACECRAFT EXTENDIBLE BOOMS.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 13M.
AD-657 154 Not available from CFSTI.

PERFORMANCE OF THE SUPPORT SYSTEMS ABOARD THE DME-A SATELLITE, 29 NOV. 1965-FEB. 1967.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
S. J. Maranto. Apr 67, 113p Rept no. TG-907
Contract NOw-62-0604

Descriptors: (*Scientific satellites, Performance (Engineering)), Design, Attitude control systems, Attitude indicators, Telemeter systems, Command + control systems, Satellite antennas, Solar cells, Power supplies, Spacecraft components.

The report describes the performance of the support systems aboard the DME-A satellite, i.e., the

attitude control, attitude detection, telemetry, command, antenna, and power systems, all of which were developed, fabricated, and tested by the Applied Physics Laboratory of The Johns Hopkins University. The scientific results obtained from the experiments aboard the satellite are not discussed in this document. The Introduction and Spacecraft Design sections of this report are presented to familiarize the reader with the project implementations and the basic design of the DME-A satellite, respectively. The DME-A satellite continues to successfully fulfill its mission objectives and provide useful scientific data, even after exceeding by over four months the one-year useful operating lifetime for which it was designed. (Author)
AD-657 156 HC$3.00 MF$0.65

DATA TRANSMISSION AND INSTRUMENTATION SYSTEMS FOR SPACE VEHICLES.
Final rept. 1 Apr 63-31 Mar 67,
Northeastern Univ Boston Mass
J. Spencer Rochefort, Lawrence J. O'Connor, Raimundas Sukys, and Arthur Glazer. 30 Apr 67, 81p
AFCRL-67-0338
Contract AF 19 (628)-2433

Descriptors: (*Spacecraft, Data transmission systems), (*Instrumentation, Spacecraft), Telemeter systems, S band, X band, Reentry vehicles, Balloons, Temperature, Meteorological radar, Rockets, Attitude control systems.

The report summarizes the main work carried out under this contract (April 1, 1963 through March 31, 1967). The contract effort can be grouped under programs concerned with an orbiting vehicle, a re-entry vehicle, field support for certain sounding rockets and balloons, evaluation of commercial telemetry system components, and system studies and developments related to telemetry and weather radar. The orbital vehicle effort is concerned with a telemetry subsystem, a data storage system, aspect instrumentation and determination and a commutator. The discussion of the instrumentation of a Trailblazer II rocket for a re-entry experiment includes treatment of an s-band pulsed system, an x-band PPM telemeter and certain probes. A tabulation is given of commercial airborne telemetry components tested and evaluated since detailed results are published in scientific reports which are available to authorized agencies. The field support rendered in connection with the various programs is tabulated. Specific discussion is given to a PAM/FM system, temperature studies of balloon telemetry systems, and the modification of a weather radar. (Author)
AD-657 287 HC$3.00 MF$0.65

PROGRAM SOLUTIONS TO SPACE SCIENCE PROBLEMS,
International Business Machines Corp Cambridge Mass Cambridge Advanced Space Systems Dept
For primary bibliographic entry see Field 9B.
AD-657 333 HC$3.00 MF$0.65

ASSEMBLY/STERILIZER FACILITY FEASIBILITY PROGRAM, VOLUME I FINAL REPORT.
General Electric Co., Philadelphia, Pa. Missile and Space Div.
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 19.
N67-32714 HC$3.00 MF$0.65

LUNAR ORBITER I, EXTENDED-MISSION OPERATIONS.
Boeing Co., Seattle, Wash.
Aug 67, 22p NASA-CR-848, D2-100727-4
Contract NAS1-3800

Descriptors: *Lunar orbiter, *Spacecraft performance, *Thermal degradation, Control, Degradation, Eclipse, Lunar, Orbit, Performance, Power, Simulation, Spacecraft, Supply, Temperature, Thermal, Tracking.

For abstract, see STAR 05 19.
N67-32720 HC$3.00 MF$0.65

LOW-SPEED DYNAMIC MODEL INVESTIGATION OF APOLLO COMMAND MODULE CONFIGURATIONS IN THE LANGLEY SPIN TUNNEL.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
S. M. Burk, Jr., and H. A. Lee. Aug 67, 42p
NASA-TN-D-3888

Descriptors: *Apollo spacecraft, *Command module, *Drogue parachute, *Dynamic stability, Apex, Blunt, Command, Configuration, Determination, Drogue, Dynamic, End, Forward, Low speed, Module, Motion, Parachute, Spin, Stability, Subsonic, Test, Tunnel.

For abstract, see STAR 05 19.
N67-33022 HC$3.00 MF$0.65

SIMULATION OF DEPLOYMENT DYNAMICS OF SPINNING SPACECRAFT.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
G. H. Honeycutt, and W. E. Lang. Aug 67, 25p
NASA-TN-D-4074
Contract 124-08-05-11-51

Descriptors: *Environment simulation, *Spacecraft design, *Spin stabilization, *Test method, Analog, Analysis, Appendage, Centrifugal, Computer, Conservation, Coriolis effect, Deployment, Design, Digital, Dynamics, Effect, Energy, Environment, Facility, Formulation, Gravity, Inertia, Kinematics, Kinetic, Method, Momentum, Numerical, Simulation, Solution, Spacecraft, Spin, Stabilization, Test.

For abstract, see STAR 05 19.
N67-33047 HC$3.00 MF$0.65

ELEMENTS OF DESIGN REVIEW FOR SPACE SYSTEMS.
National Aeronautics and Space Administration, Washington, D. C.
R. E. Boss, and C. H. Mc Gaffin. 1967, 62p
NASA-SP-6502
Contract NASW-1128

Descriptors: *Contractor, *Optimization, *Performance characteristics, *Systems design, Characteristics, Control, Data, Design, Handbook, Input, Output, Performance, Process, Production, Requirement, Space, System.

For abstract, see STAR 05 19.
N67-33400 HC$3.00 MF$0.65

ANALYSIS AND DESIGN OF SPACE VEHICLE FLIGHT CONTROL SYSTEMS. VOLUME VI STOCHASTIC EFFECTS.
General Dynamics/Convair, San Diego, Calif.
A, L. Greensite. Jul 67, 129p NASA-CR-825, GDC-DDE66-006
Contract NAS8-11494
Refs

Descriptors: *Control system, *Space vehicle, *Statistical analysis, *Stochastic process, *Systems design, *Test method, Aerospace, Analysis, Application, Bibliography, Color, Control, Design, Effect, Error, Filter, Function, Instrumentation, Kalman-schmidt filter, Launch, Linear, Load, Method, Minimization, Noise, Process, Quasi-linear, Random, Separation, Signal, Space, Statistical, Stochastic, System, Test, Theory, Variable, Vehicle, Wiener filter, Wind.

For abstract, see STAR 05 19.
N67-33461 HC$3.00 MF$0.65

DECONTAMINATION OF THE AIMP-D SPACECRAFT.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
F. N. Le Doux. Apr 67, 78p NASA-TM-X-55870, X-723-67-171

Descriptors: *Circuit board, *Decontamination, *Field effect transistor (fet), *Lunar orbiter, *Metal oxide semiconductor (mos), Board, Circuit, Clean, Coating, Effect, Electronic, Encapsulation, Fet, Field, Handling, Metal, Mos, Oxide, Room, Sampling, Semiconductor, Transistor.

For abstract, see STAR 05 19.
N67-33474 HC$3.00 MF$0.65

ON THE COLLECTION OF COSMIC DUST SAMPLES FOR CRYSTALLOGRAPHIC STUDY.
Stockholm Univ. (Sweden). Inst. of Meteorology.
J. F. Kerridge. Apr 67, 30p ESRO-SN-52
Sponsored By Esro

Descriptors: *Cosmic dust, *Crystallography, *Dust collector, *Electron diffraction, Aluminum, Collector, Cosmic, Diffraction, Dust, Electron, Film, Flight, High altitude, Micrometeorite, Particle, Recovery, Sample, Solar, Space, Surface, System.

For abstract, see STAR 05 19.
N67-33521 HC$3.00 MF$0.65

SUGGESTIONS FOR MAGNETOSPHERIC EXPERIMENTS.
Imperial Coll. of Science and Technology, London (England).
For primary bibliographic entry see Field 4A.
For abstract, see STAR 05 19.
N67-33522 HC$3.00 MF$0.65

APPLICATION OF GEBHART'S METHOD TO THE COMPUTATION OF RADIATIVE EXCHANGES INSIDE AN ENVIRONMENTAL CHAMBER.
Application de La Methode de Gebhart Au Calcul des Echanges Radiatifs A l'Interieur D'une Chambre D'essais
European Space Technology Center, Noordwijk (Netherlands).
A. Taroni, and M. Toussaint. Apr 67, 63p ESRO-TN-13
in French, English Summary

Descriptors: *Esro i satellite, *Radiative heat transfer, *Solar simulator, *Vacuum chamber, Absorption, Calculation, Chamber, Energy, Environment, Exchange, Flux, Heat transfer, Radiative, Satellite, Simulator, Solar, Surface, Test, Vacuum.

For abstract, see STAR 05 19.
N67-33643 HC$3.00 MF$0.65

INTEGRATION PLAN FOR THE RADIO ASTRONOMY EXPLORER (RAE) SPACECRAFT.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
M. M. Grant, and N. J. Piterski. Sep 66, 28p
NASA-TM-X-55855, X-722-66-459

Descriptors: *Explorer satellite, *Radio astronomy, *Spacecraft electronic equipment, Astronomy, Calibration, Control, Electronic, Environment, Equipment, Facility, Handbook, Integration, Measurement, Radio, Satellite, Spacecraft, Testing, Voice.

For abstract, see STAR 05 19.
N67-33853 HC$3.00 MF$0.65

CALCULATION OF SIGNAL MARGINS FOR THE CSM UNIFIED S-BAND DOWNLINK CHANNEL APOLLO AS-202 TO AIRCRAFT NASA 432.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 17B.
For abstract, see STAR 05 19.
N67-33855 HC$3.00 MF$0.65

AERODYNAMIC CHARACTERISTICS OF THREE AXISYMMETRIC LOW FINENESS RATIO REENTRY SHAPES AT MACH 6.9.

National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 19.
N67-33876 HC$3.00 MF$0.65

22C. Spacecraft Trajectories and Reentry

DYNAMICAL EQUATIONS FOR THE POSITION AND ATTITUDE OF A SPACECRAFT WITH TIME DEPENDENT MASS AND MASS PROPERTIES.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
V. L. Pisacane, W. H. Guier, and P. P. Pardoe.
Jun 67, 54p Rept no. TG-919
Contract NOw-62-0604

Descriptors: (*Orbital trajectories, Spacecraft), Nonlinear differential equations, Equations of motion, Gravity, Position finding.

Nonlinear differential equations for the position and attitude of a spacecraft under the influence of gravitational and nonconservative forces are developed in terms of Lagrangian mechanics. The significance of the results is that the equations are cast in a form which makes them suitable for digital solution. The spacecraft is assumed to have a completely general configuration with mass a function of time, and mass properties a function of time and the generalized coordinates and velocities. The equations of motion for the center of mass of the system are obtained in terms of a perturbation from an arbitrary reference trajectory. The equations describing the attitude motion are in terms of a general set of Euler angles. These angles relate the orientation of a reference frame fixed in the spacecraft to a reference frame whose orientation can be specified as an arbitrary function of time in inertial space. The introduction of a general set of Euler angles provides either for the convenient use of a dual set of angles to avoid singularities or for the selection of a natural set of angles for a specific application. Expressions for the partitioned energies and the generalized forces are also presented. The paper is concluded with the application of the equations of motion for the case when the reference trajectory is a Keplerian ellipse. The effect of the J2 zonal harmonic term of the gravitational potential expansion of the principal gravitating mass and the coupling between the trajectory and attitude motion are included. (Author)
AD-656 891 HC$3.00 MF$0.65

THE EFFECT OF TANGENTIAL ACCELERATION ON THE MOTION OF A SATELLITE.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
Yu. G. Evtushenko. Aug 67, 14p
ACIC-TC-1220, TT-67-62628
Vliyanie Kasatelnogo Uskoreniya na Dvizhenie Sputnika, trans. of Priklad naya Matematika i Mekhanika (USSR), n3 p594-8 1966.

Descriptors: (*Satellites (Artificial), Orbital trajectories), Approximation (Mathematics), Circular orbit trajectories, Acceleration, Mathematical analysis, Oscillation.

The problem of the motion of a satellite under the effect of tangential acceleration, created by a low-thrust engine, has been solved in other works. This problem is of interest because numerical computations show that the tangential control of the engine thrust approximates well the solution of the problem of the optiminal boost of the satellite. An asymptotic computation of the effect of a reduced tangential acceleration on the motion of a satellite is given in this work by the averaging method. The first approximation solution computed is correct for arbitrary values smaller than a unit of the eccentricity of the satellite unit. The other approximation solution computed is for the problem in the case of near-circular orbits. (Author)
AD-656 989 HC$3.00 MF$0.65

THE ORBIT OF INJUN 3 ROCKET (1962 BETAr 6) FOR 20 APRIL TO 1 MAY 1966.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
Diana W. Scott. Dec 66, 17p Rept no. RAE-TR-66395

Descriptors: (*Scientific satellites, *Orbital trajectories), Accuracy, Tables, Perigee, Apogee, Scientific research.
Identifiers: Injun 3.

Orbital parameters of Injun 3 rocket have been determined from 174 optical and radar observations, at 7 ascending nodes in late April 1966. This is a continuation of earlier determinations of the satellite's orbit in 1963-1965. (Author)
AD-657 202 HC$3.00 MF$0.65

A MANIFOLD OF PERIODIC ORBITS,
Boeing Scientific Research Labs Seattle Wash Mathematics Research Lab
For primary bibliographic entry see Field 20K.
AD-657 341 HC$3.00 MF$0.65

GEOPHYSICAL CONSTANT DETERMINATION FROM SATELLITE OBSERVATIONS: DIGITAL COMPUTER PROGRAM.
Martin Co Baltimore Md
For primary bibliographic entry see Field 8E.
AD-657 361 HC$3.00 MF$0.65

ON THE DYNAMICAL THEORY OF A NEAR-EARTH SATELLITE II,
Oslo Univ (Norway) Inst of Theoretical Astrophysics
Kaare Aksnes. 1967, 24p
Availability: Published in Astrophysica Norvegica v10 n8 p149-69 Feb 1967.

Descriptors: (*Satellites (Artificial), *Elliptical orbit trajectories), Gravity, Periodic variations, Mathematical analysis, Perturbation theory.

An approximate solution of the problem based on a simple intermediary orbit has been given in an earlier paper. Herein, however, the perturbed values of the elements of the orbit are derived using Delaunay's and von Zeipel's method involving a development in powers of the constants Bj in the expansion for the gravitational potential of the earth. The mode of approach is essentially the same as that used by Brouwer and Garfinkel in their treatments of the same problem; however, the present solution is also valid at the critical inclination. The solution includes secular terms proportional to B2, B2 superscript 2 and B4 as well as periodic terms proportional to B2, B3/B2, B4/B2 and B5/B2. (Author)
AD-657 407 Not available from CFSTI.

GUIDE TO HAMILTONIAN TECHNIQUE FOR FORMULATION OF ORBITAL PROBLEMS.
Guide A La Technique Hamiltonienne pour La Formulation des Problemes Orbitaux
European Space Vehicle Launcher Development Organization, Paris (France).
E. Cambi. May 67, 53p ELDO-TM-F-42
in French

Descriptors: *Canonical problem, *Hamiltonian, *Orbit perturbation, Canonical, Earth, Equation, Field, Flattening, Gravitational, Hamilton-jacobi equation, Lagrange coordinate, Lagrange equation, Orbit, Perturbation, Problem, Trajectory.

For abstract, see STAR 05 19.
N67-33452 HC$3.00 MF$0.65

A MANUAL ABORT GUIDANCE TECHNIQUE WITH CONCENTRIC-FLIGHT-PLAN RENDEZVOUS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
L. K. Barker, and G. K. Miller, Jr.. Aug 67, 47p
NASA-TN-D-4089
Contract 127-51-01-02-23

Descriptors: *Abort, *Lunar landing module, *Manual control, Apollo project, Concentric, Control, Device, Flight, Initiation, Landing, Lunar, Manned, Manual, Module, Optical, Orbit, Plan, Rendezvous, Thrust, Trajectory.

For abstract, see STAR 05 19.
N67-33456 HC$3.00 MF$0.65

DEDUCTION OF REENTRY PLASMA PROPERTIES ABOUT MANNED ORBITAL SPACECRAFT FROM RADIO SIGNAL ATTENUATION DATA.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
P. W. Huber. Aug 67, 37p NASA-TN-D-4118
Contract 129-01-06-03-23
Refs

Descriptors: *Electromagnetic absorption, *Manned spacecraft, *Plasma flow, *Radio signal, *Reentry vehicle, *Signal fadeout, Ablation, Absorption, Afterbody, Attenuation, Boundary, Composition, Concentration, Data, Effect, Electromagnetic, Electron, Fading, Flow, Gemini spacecraft, Layer, Loss, Manned, Measurement, Mercury (ma-6) flight, Mixing, Model, Near, Orbital, Plasma, Radio, Reduction, Reentry, Separation, Signal, Spacecraft, Vehicle.

For abstract, see STAR 05 19.
N67-33463 HC$3.00 MF$0.65

APPLICATION OF THE GRADIENT METHOD TO THE NUMERICAL STUDY OF LIMITED-POWER TRANSFERS BETWEEN NEAR-COPLANAR CIRCULAR ORBITS. COMPARISON WITH LINEARIZED SOLUTIONS.
Application de La Methode Du Gradient A l'Etude Numerique des Transferts A Puissance Limitee Entre Orbites Circulaires Coplanaires Proches. Comparaison Avec La Solution Linearisee
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
H. Girard. 1967, 91p ONERA-TN-112/1967/
in French, English Summary

Descriptors: *Circular orbit, *Gradient, *Orbital transfer, *Trajectory optimization, *Transfer orbit, Calculation, Circular, Coplanar, Initial, Linearization, Optimization, Orbit, Power, Radius, Ratio, Rendezvous, Transfer.

For abstract, see STAR 05 19.
N67-33534 HC$3.00 MF$0.65

DETERMINATION OF THE POSITION OF THE SUN ON THE BASIS OF THE MEAN SOLAR ELEMENTS.
European Space Data Centre, Darmstadt (West Germany).
For primary bibliographic entry see Field 3C.
For abstract, see STAR 05 19.
N67-33535 HC$3.00 MF$0.65

LOW-THRUST ORBIT RAISING IN CONTINUOUS SUNLIGHT WHILE THRUSTING IN A PLANE PERPENDICULAR TO THE EARTH-SUN LINE.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. R. Ramler. Aug 67, 47p NASA-TN-D-4104
Contract 124-06-01-02-22
Refs

Descriptors: *Earth orbit, *Spacecraft trajectory, *Sunlight, *Thrust effect, Angle, Earth, Effect, Error, Geometry, Mechanics, Orbit, Perturbation, Plane, Spacecraft, Thrust, Trajectory, Vector.

For abstract, see STAR 05 19.
N67-33552 HC$3.00 MF$0.65

22D. Spacecraft Launch Vehicles and Ground Support

A STUDY OF THE CHARACTERISTICS OF TRANSONIC BUFFET PRESSURES ON A LARGE HAMMERHEAD CONFIGURATION,
Aerospace Corp El Segundo Calif Technical Operations

For primary bibliographic entry see Field 20D.
AD-657 013 HC$3.00 MF$0.65

COMMAND PROCESSORS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 9F.

For abstract, see STAR 05 19.
N67-33039 HC$3.00 MF$0.65

NEW SYSTEMS OF TRAJECTOGRAPHY.
Nouveaux Dispositifs de Trajectographie
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
R. Moreau. 1967, 39p ONERA-TP-446/1967/ in French Presented At the Meeting of the Soc. Franc. des Electroniciens Et Radioelectriciens, Paris, 21 Nov. 1966

Descriptors: *Atomic clock, *Ruby laser, *Tracking station, *Trajectory measuring system, Atom, Clock, Finder, Laser, Measuring, Oscillator, Range, Ruby, System, Trajectory.

For abstract, see STAR 05 19.
N67-33959 HC$3.00 MF$0.65

★ U.S. GOVERNMENT PRINTING OFFICE : 1967 OL—305-088 (7)

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